CALIFORNIA
ENERGY
COMMISSION

Investing in RENEWABLE ELECTRICITY GENERATION in California

Report to the Legislature

COMMITTEE DRAFT REPORT

DECEMBER 2000
P500-00-022

Gray Davis, *Governor*

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512

STATE OF CALIFORNIA
ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION

Implementation of Renewables Legislation (Public Utilities Code Sections 381, 383.5, 399, and 445) [SB 1194, AB 995]	)))))	**Docket No. 00-REN-1194 Committee Workshops Re: Renewable Investment Plan**

NOTICE OF COMMITTEE HEARING ON THE RENEWABLE INVESTMENT PLAN

The California Energy Commission s Electricity and Natural Gas Committee will hold a hearing to receive comments on the enclosed Committee Draft Report *Investing in Renewable Electricity Generation in California*, pursuant to Senate Bill 1194 (SB 1194; Chp. 1050, Stats. 2000) and Assembly Bill 995 (AB 995; Chp. 1051, Stats. 2000). The date and location of the hearing are as follows:

FRIDAY, JANUARY 5, 2001
Beginning at 10 a.m.
CALIFORNIA ENERGY COMMISSION
First Floor, Hearing Room A
1516 Ninth Street
Sacramento, California
(Wheelchair accessible)

Background

SB 1194 and AB 995 extend the collection of a non-by-passable system benefit charge to support various public goods programs, including renewables, through January 1, 2012. The legislation requires that an amount starting at $135 million per year is to be collected over a ten-year period from the ratepayers of Southern California Edison, San Diego Gas and Electric Company, and Pacific Gas and Electric Company beginning in January 2002, and is to be transferred to the Renewable Resource Trust Fund to support investments in renewable power. The legislation also requires the Energy Commission to create an investment plan with the long-term goal of a fully competitive and self-sustaining California renewable energy supply. The investment plan must recommend funding allocations among the following:

- Production incentives for new renewable energy, including repowered or refurbished renewable energy.
- Rebates, buydowns, or equivalent incentives for emerging renewable technologies.
- Customer credits for renewables not under contract with a utility.
- Customer education.

- Incentives for reducing fuel costs that are confirmed to the satisfaction of the Energy Commission at solid fuel biomass energy facilities to provide demonstrable environmental and public benefits, including but not limited to, air quality.
- Solar thermal generating resources and existing wind-generating resources, if the Energy Commission makes certain specific findings.
- Specified fuel cell technologies, if the Energy Commission makes specific findings.

The investment plan must also contain specific numerical targets reflecting what impact the plan would have on an increased quantity of renewable generation in California, both overall and from emerging technologies, as well as on the increased supply of renewable generation available from facilities not under utility contracts entered into prior to 1996.

The Committee held three workshops in October and November of 2000 to solicit input from interested parties on the allocation of funds, appropriate numerical targets, interaction with the current Renewable Energy Program, and specific issues relating to each potential allocation area. The Committee considered all information presented at those workshops, including all written submittals, in designing the enclosed draft investment plan.

Written Comments

The Committee asks parties who propose alternatives to the specific Committee recommendations contained in this draft investment plan to submit specific analysis and data supporting their potential alternatives.

Participants and any other interested members of the public should submit any written comments at the beginning of the hearing. Please bring enough copies for other participants (we suggest 50). Written comments submitted at the hearing must be filed with the Docket Office and will become part of the public record in this proceeding. An original and twelve copies of any written comments not submitted at the hearing must be sent or delivered to the Commission s Docket Unit **no later than 5 p.m. Tuesday, January 9, 2001. Comments must include the Docket Number for this proceeding (00-REN-1194) on the cover page.** Please submit material to be docketed to:

California Energy Commission
Re: Docket No. 00-REN-1194
Docket Unit, MS-4
1516 Ninth Street
Sacramento, CA 95814-5504

Comments may also be sent by e-mail to the Docket Office at: <DOCKET@energy.state.ca.us>.

Assistance

The Energy Commission s Public Adviser provides assistance to the public regarding Commission procedures and participation in Commission activities. You may contact the Public Adviser s Office by phone at (916) 654-4489, toll-free in California at (800) 822-6228, by fax at (916) 654-4493, or by e-mail at <pao@energy.state.ca.us>. If you have a disability and require

reasonable accommodation to participate, please contact Robert Sifuentes at (916) 654-5004 at least five days before the meeting. If you have technical questions regarding the content of this notice, you may contact Marwan Masri, Renewable Energy Program Manager, by phone at (916) 654-4531 or by e-mail at <mmasri@energy.state.ca.us>. News media inquiries should be directed to Claudia Chandler, Assistant Director, at (916) 654-4989.

Dated: December 22, 2000

ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION

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CHAPTER 1

INTRODUCTION

Legislative Requirements

Assembly Bill 995[1] and Senate Bill 1194,[2] enacted on September 30, 2000, create the Reliable Electric Service Investments Act (RESIA)[3] and extend the collection of a non-bypassable system benefit charge that was initially established under Assembly Bill 1890 (AB 1890) in September 1996 and distributed pursuant to Senate Bill 90 (SB 90) starting in January 1998. The system benefit charge is collected from the ratepayers of California s investor-owned utilities (IOU), and is intended to support cost-effective energy efficiency and conservation activities, public interest research and development, and development of renewable resources.

The RESIA requires that an amount starting at $135 million per year is to be collected over a ten-year period from the ratepayers of Southern California Edison, San Diego Gas and Electric Company, and Pacific Gas and Electric Company beginning in January 2002, and is to be transferred to the Renewable Resource Trust Fund to support investments in renewable power. The amount collected shall be adjusted annually at a rate equal to the lesser of annual growth in electricity commodity sales or inflation. Under RESIA, the Energy Commission retains its oversight responsibilities for administering the Renewable Resource Trust Fund as established by SB 90.

The RESIA requires the Energy Commission to create an investment plan for the Legislature s consideration that recommends an allocation of the funds collected over the first five years of the collection period, January 2002 through January 2007. The allocations are to be based on three main objectives:

1) To ensure the vigorous pursuit of the most cost-effective and efficient investments in renewable resources, with the long-term goal of a fully competitive and self-sustaining renewable energy supply in California;

2) To increase, in the near-term, the quantity of California's electricity generated by in-state renewable energy resources, while protecting system reliability, fostering resource diversity, and obtaining the greatest environmental benefits for California residents; and

[1] Stat. 2000, Ch. 1051.
[2] Stat. 2000, Ch. 1050.
[3] Article 15, Ch. 2.3, Part 1, Div. 1 of the Public Utilities Code, commencing with ⁄399. Unless noted otherwise, subsequent citations herein are to the Public Utilities Code.

3) To identify and support emerging renewable energy technologies that have the greatest near-term commercial promise and that merit targeted assistance.

In addition, the RESIA provides that the Energy Commission shall establish specific numerical targets that reflect the projected impact of the plan for (a) increased quantity of California electrical generation produced from emerging technologies and from overall renewable resources and (b) increased supply of renewable generation available from facilities other than those selling to investor-owned utilities (IOUs) under contracts entered into before 1996 under the federal Public Utilities Regulatory Policies Act of 1978 (PURPA).

The RESIA requires the Energy Commission to evaluate progress toward these objectives, on an annual basis, along with assessing the impact of the investment plan on reducing the cost of renewable energy generation to Californians.

The RESIA directs the Energy Commission to recommend funding allocations among the following eight categories:

- Production incentives for new renewable energy, including repowered or refurbished renewable energy.[4]
- Rebates, buydowns, or equivalent incentives for emerging renewable technologies.
- Customer credits for renewables not under contract with a utility.
- Customer education.
- Incentives for reducing fuel costs that are confirmed to the satisfaction of the Energy Commission at solid fuel biomass energy facilities to provide demonstrable environmental and public benefits, including improved air quality.
- Solar thermal generating resources that enhance the environmental value or reliability of the electricity system and that require financial assistance to remain economically viable, as determined by the Energy Commission.
- Existing wind-generating resources, if the Energy Commission finds that the existing wind-generating resources are a cost-effective source of reliability and environmental benefits compared with other eligible sources, and if the Energy Commission determines that existing wind-generating resources require financial assistance to remain economically viable.

[4] The RESIA restricts new allocations from being provided to renewable energy that is generat that remains under a power purchase contract with an electrical corporation originally entere September 24, 1996 unless specific conditions are met (/399.6, subd. (c)(1)).

- Specified fuel cell technologies, if the Energy Commission makes all of the following findings:

    1) The specified technologies have similar or better air pollutant characteristics than renewable technologies in the investment plan.

    2) The specified technologies require financial assistance to become commercially viable by reference to wholesale generation prices.

    3) The specified technologies could contribute significantly to the infrastructure development or other innovation required to meet the long-term objective of a self-sustaining, competitive supply of renewable energy.

The investment plan is divided into eight chapters. In this first chapter, the Energy Commission provides an overview of the renewable energy industry in the state, followed by an overview of the Energy Commission s Renewable Energy Program, and lastly a description of the investment plan development process. Chapter 2 discusses the policy objectives guiding the overall allocation of funding, eligibility and exclusions for funding, numerical targets, and program administration. Chapters 3 through 8 address issues specific to the individual sectors of the industry (existing, new, emerging, fuel cells, etc.). Definitions of terms used in the investment plan follow Chapter 8.

The Renewable Energy Industry

Over the past two decades, California has developed one of the largest and most diverse renewable generation industries in the world. In the year 2000, California had over 7,200 megawatts (MW) of renewable energy capacity, including solid-fuel biomass, geothermal, wind, small hydroelectric (30 MW or less), solar thermal, photovoltaics, landfill gas, digester gas, and municipal solid waste facilities. These facilities produced an estimated 33,779 gigawatt hours (GWh) in 1999, representing about 12 percent of the electricity used in California. Figures 1-1 and 1-2 show the technologies relative capacity (MW) and generation (GWh) shares within the renewable power industry for 2000 and 1999 respectively.

Much of California s renewable development arose from the federal Public Utility Regulatory Policies Act of 1978 (PURPA), which required utilities to purchase power from non-utility generators, including renewable generators, at the utilities full avoided cost. PURPA was implemented in California through the use of standard offer contracts between utilities and non-utility generators. There are four types of these contracts, with most non-utility renewables in California under the Interim Standard Offer 4[5] (ISO4) contracts. The ISO4 contracts, which covered a period of up to 30 years, provided fixed per kilowatt hour (kWh) energy payments for up to 10 years based on forecasted avoided costs, with payments converting to short-run avoided costs in

[5] The Standard Offer Number 4 contracts were intended to be interim, pending final regulatory de
standard terms. However, the ISO4 offers were suspended (no longer available for new contracts)
offers were suspended in March 1986), after a large amount of capacity was signed.

year 11 of the contracts. The contracts also provided fixed capacity payments for up to 30 years. These guaranteed energy and capacity payments helped to attract financing for independent energy projects. As a result of the availability of these contracts, about 5,000 MW of renewable capacity were added to California s electricity system between 1985 and 1990.

Figure 1-1
California's In-State Renewable Capacity
2000

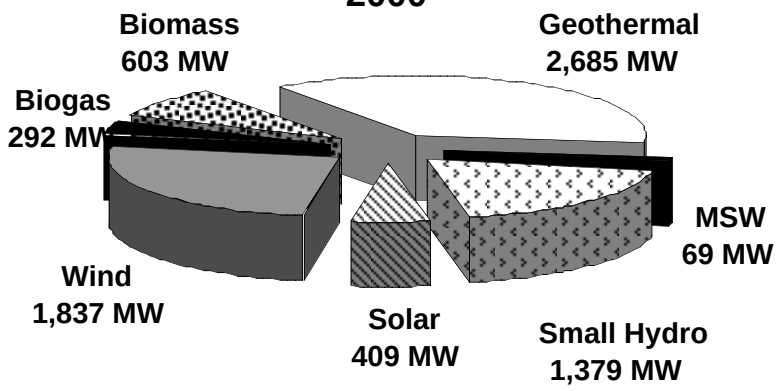
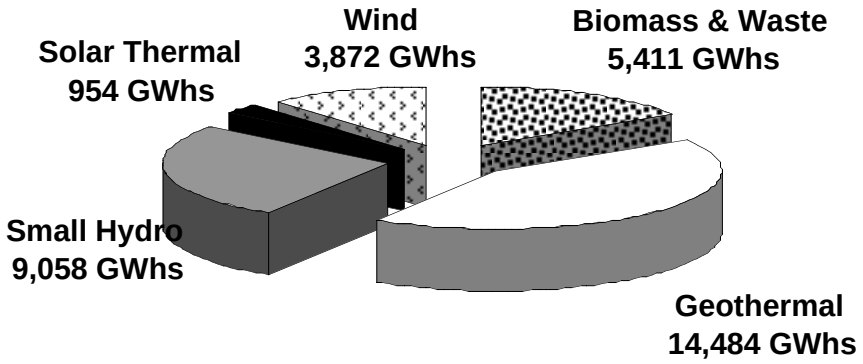


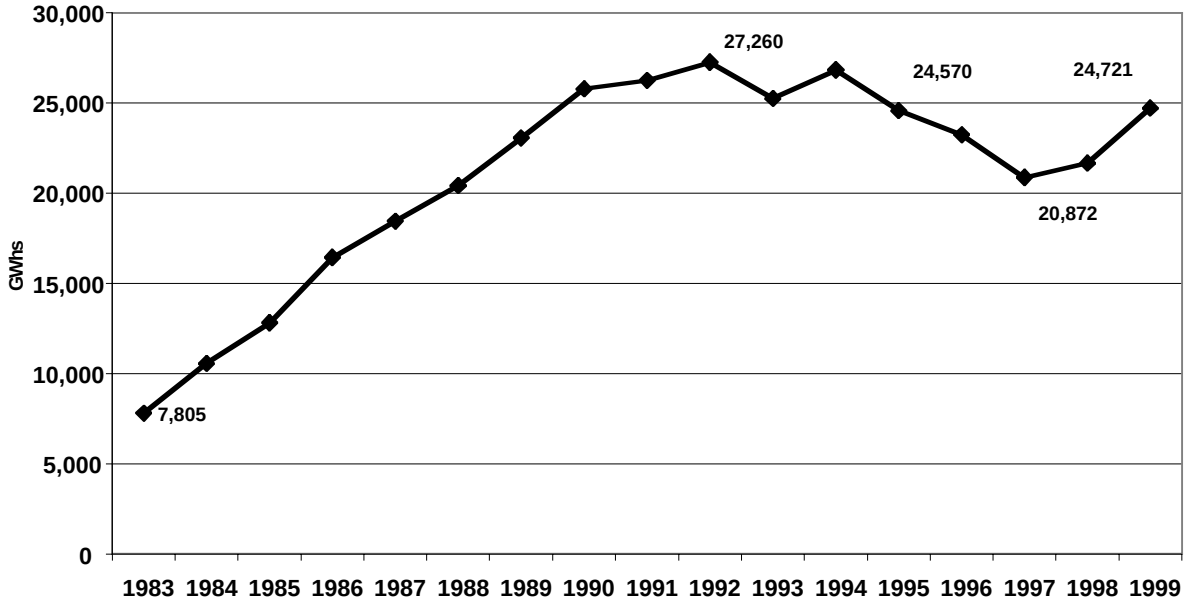
Figure 1-2
California's In-State Renewable Generation
1999



In the last decade, renewable energy generation in California declined, due partly to low energy prices combined with the end of the high fixed-energy price period for many ISO4 contracts. When these contracts were originally signed, avoided costs were

expected to increase over time. Instead, they decreased significantly in the late 1980s and continued to be low during the 1990s. This situation created what was known as the price cliff for facilities with ISO4 contracts, since at that time, short-run energy prices were as much as 85% lower than the energy prices these facilities received toward the end of the fixed price period. Figure1-3 illustrates the statewide pattern of renewable energy generation over the period 1983-1999.

Figure 1-3
California Renewable Generation



Source: California Energy Commission (non-hydro renewable generation only)

During the summer and fall of 2000, electricity prices in the Western region rose dramatically due to a variety of factors, including inadequate electricity supply, prolonged above-average temperatures, wholesale market failures, and significantly increased natural gas prices and environmental costs. Short-run avoided costs (SRAC) were also high and renewable generators were paid as much as 16.5 cents per kWh (weighted monthly average SRAC) for their generation. With the high market prices for energy seen during this period, many renewable technologies could conceivably survive on their own with no further assistance.

Most market observers suspect, however, that the high electricity prices are not sustainable in the long-term. A substantial amount of gas-fired generating capacity is currently in the pipeline and prices could fall in response to this increased supply. In addition, the competitive market is currently under intense regulatory and legislative scrutiny, and the resulting initiatives could also lead to lower prices. In either case, prudent renewable developers may regard the present high prices as a relatively short-

term phenomenon. In such a highly uncertain atmosphere, developers and their financial backers might be reluctant to commit to renewable energy projects, which tend to be capital intensive. To provide some measure of market certainty while protecting against unnecessary payments, incentive programs should be linked to market prices. This design feature is a prominent feature of the current REP and is proposed to be continued under the RESIA.

An Overview of the Renewable Energy Program

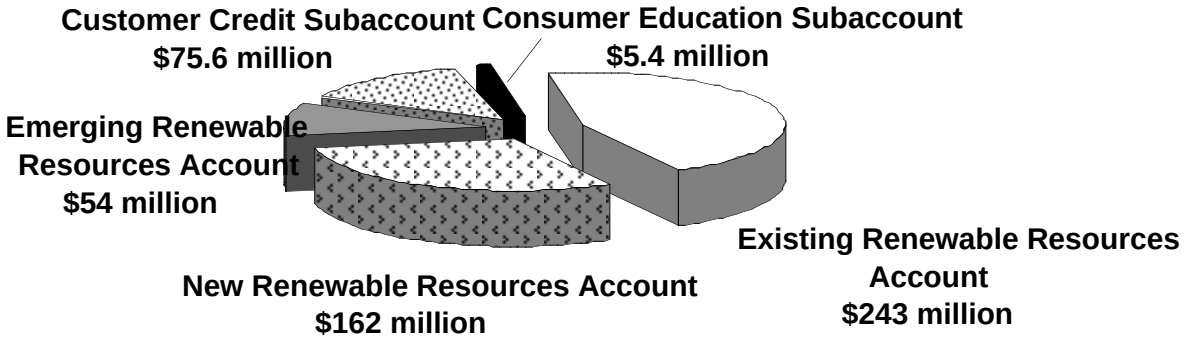
The Renewable Energy Program (REP) was established pursuant to AB 1890[6] and SB 90[7] to provide support to reduce or reverse the declining trend in renewables generation in California. AB 1890 directed the collection of $540 million from IOU ratepayers through a system benefit charge collected over a four-year transition period starting in January 1998. These funds were intended to support existing, new, and emerging renewable electricity generation technologies. The Energy Commission submitted a report to the Legislature in March 1997 with recommendations on how that funding should be allocated: 45 percent to existing technologies, 30 percent to new technologies, 10 percent to emerging technologies, and 15 percent to customer rebates and consumer education. The Legislature incorporated the allocation recommendations into SB 90, passed October 12, 1997, and directed the Energy Commission to administer the program.

The REP began operation in January 1998. The program is divided into five Accounts, shown in Figure 1-4.

Existing Renewable Resources Account

[6] Stat. 1996, Ch. 854.
[7] Stat. 1997, Ch. 905.

Figure 1-4
Renewable Energy Program Funding Allocation



Funds in the Existing Renewable Resources Account are distributed through a cents per kWh production incentive for qualifying renewable energy. The Account is divided into tiers intended to reflect the relative competitiveness of the various renewable technologies. As shown in Table 1-1, each tier was assigned a target price and cap. Payments to each tier are calculated each month by the lower of either the target price minus the market price for electricity, the available funds divided by the amount of generation submitted by all facilities in each tier that month, or the pre-determined cap for that tier. Monthly payments to each tier can be as low as zero but no higher than the specified cap.

Table 1-1
Existing Renewable Resources Account Target Prices and Caps by Tier (¢/kWh)

		1998	1999	2000	2001
Tier 1 (Biomass, Solar Thermal, Waste Tire)	Target Price	5.0	4.5	4.0/5.0*	5.0*
	Cap	1.5	1.5	1.0	1.0
Tier 2 (Wind)	Target Price	3.5	3.5	3.5	3.5
	Cap	1.0	1.0	1.0	1.0
Tier 3 (Geothermal, Sm Hydro, Digester Gas, Muni. Solid Waste, Landfill Gas)	Target Price	3.0	3.0	3.0	3.0
	Cap	1.0	1.0	1.0	1.0

* In an effort to increase generation from biomass facilities, the Energy Commission raised the target price for Tier 1 technologies to 5.0 cents per kWh in October 2000.

New Renewable Resources Account

For the New Renewable Resources Account, funds were allocated through two auctions in which project proponents submitted bids for production incentives along with their estimated generation for the first five years of program participation. Bids were

accepted from lowest to highest until all funds were exhausted or all bidders were accepted. The Energy Commission capped the individual bids at 1.5 cents per kWh pursuant to SB 90. Projects have a specified time to come on-line, after which they are paid the production incentive they bid for each month s qualifying generation. Payments are made for the first five years only.

Emerging Renewable Resources Account

The Emerging Renewable Resources Account provides capital cost buydowns for the purchase of small renewable systems intended primarily to offset a customer s own load. The buydown funds are divided into five blocks as shown in Table 1-2, with successively lower incentives in each block.

Table 1-2
Emerging Buydown Program

Program Block	1	2	3	4	5	Total
Total funds per block (millions)	$10.5	$10.5	$10.5	$10.5	$12.0	$54.0
Maximum rebate per watt	$3.00	$2.50	$2.00	$1.50	$1.00	N/A
Maximum rebate (% system cost)	50%	40%	30%	25%	20%	N/A

The first block started at the lesser of $3.00 per watt or 50 percent of system cost. Eligible technologies are photovoltaic, solar thermal electric, small wind (10 kilowatts or less), and fuel cells using a renewable fuel.

Customer Credit Subaccount

In the Customer Credit Subaccount, customers can receive a rebate in cents per kWh for their purchases of qualifying renewable energy in the direct access market. The Energy Commission sets a credit level (capped at 1.5 cents per kWh) for a six-month period. Table 1-3 shows the credit level since the program began in January 1998. The Energy Commission has reduced the credit level twice, first in December 1999 and again in July 2000, because of the increased purchases of renewable generation through the course of the program, which in turn placed greater demands for funds in the Subaccount. Rebates are paid on a monthly basis to retailers of renewable energy after they pass the rebate on to the customers, showing the rebate on the customer s bill. Providers must register with the Energy Commission to receive payment.

Table 1-3
Customer Credit Level

Time Period	Credit Level
January 1998 — November 1999	1.5 ¢/kWh
December 1999 — June 2000	1.25 ¢/kWh
July 1, 2000 — December 31, 2000	1.0 ¢/kWh
January 2001 - June 2001	Proposed 1.0 ¢/kWh
July 2001 — December 2001	To be determined in spring 2001

Consumer Education Subaccount

The Consumer Education Subaccount provides funding to help raise consumer awareness of renewable electricity generation options and their benefits, increase purchases of renewable energy from the grid and purchases of small scale emerging system, and establish a self-sustaining education effort that will continue beyond the four-year transition period to a competitive electricity market.

Activities undertaken under the Consumer Education Subaccount include grass-roots and media outreach in targeted communities throughout California, market research, and development of consumer guides for prospective purchasers of renewable energy.

Timing of Funds

The allocation between Accounts in the REP varied over time to most effectively further the goals of AB 1890. Funding to the Existing Renewable Resources Account ramped down because existing technologies were expected to become increasingly cost-effective during the four-year transition period and because the market price of energy was likely to increase over time. Funding for the New Renewable Resources Account ramped up because fewer new technology projects were expected to produce electricity in the early years of the program. The allocation to the Customer Credit Subaccount also rose over time because the customer-driven market was expected to begin slowly and build in the later years of the program.

Investment Plan Development Process

The Energy Commission solicited input from renewable industry stakeholders and other interested parties at three Electricity and Natural Gas Committee (Committee) workshops held October 30, 31, and November 2, 2000. Participants were asked to respond to a list of questions about allocation recommendations, interaction with the REP, and possible program design changes, along with other questions specific to various renewable industry sectors. The Committee took into account many information sources in developing the recommendations included in this investment plan. The information sources include comments received both orally and in writing from workshop participants, input from staff technology experts, information provided by

consultants with expertise in relevant areas, and lessons learned from the operation of the REP. A Committee hearing is scheduled for January 5, 2001 to hear comments on the investment plan. Public input received at the hearing will be considered by the Committee in developing the final investment plan for Energy Commission adoption by the statutory deadline of March 31, 2001.

CHAPTER 2

ALLOCATION PRINCIPLES

Policy Objectives

The development of the Electricity and Natural Gas Committee s (Committee) draft investment plan is guided by lessons learned during ongoing implementation of the Renewable Energy Program (REP), combined with the objectives established by the Reliable Electric Service Investments Act (RESIA). Those objectives are as follows:

1) Increasing the quantity of California's electricity generated by in-state renewable energy resources,

2) Identifying and supporting emerging renewable energy technologies that have the greatest near-term commercial promise and that merit targeted assistance, and

3) Developing a fully competitive and self-sustaining renewable industry in California.

In pursuing these objectives, the Committee intends to ensure that both near- and long-term benefits are vigorously and cost-effectively pursued. By capping incentives at specified maximum levels, the Committee ensures that only the most cost-effective renewable generation participates in the program. Only the most cost-effective renewable investments, those that are able to participate at incentive levels of no higher than 1.5 cents per kWh for the New Renewables Fund, Existing Renewables Fund, and the Customer Credit Fund, are made under the proposed program. Similarly, only the most cost-effective emerging technologies investments will be made, while higher cost and/or unproven technologies are precluded from the Emerging Renewables Fund. In addition the ability to reallocate funds provides the means to redirect support from areas with little or no activity to areas where the initial allocation proves inadequate to fund all cost-effective renewable investments that could occur within the incentive cap.

With California s current electricity supply shortage, increasing the amount of renewable generation in California in the near-term has greater benefit during the next few years. In the long-term, however, sustained increases in California s renewable generation will help alleviate future supply shortages and provide increasing environmental benefits to the State. In addition, emerging renewable resources with the greatest near-term commercial promise should lead to long-term industries that will be a significant component of California s electricity supply and contribute to significant reductions in the environmental costs of supplying California s electricity. In the end, sustainable, long-term market changes will develop a competitive and self-sustaining renewable industry in California that will provide the most benefits to California, in both the near- and long-term.

The Committee believes that the direction in Assembly Bill 1890 (AB 1890) to develop and implement market-based policies to foster renewable investments remains relevant to this investment plan. The experience of implementation in the REP to date indicates that the market-based policies implemented in that program have been successful in inducing cost-effective investments in existing, new and emerging renewable technologies. The following three broad objectives contained in the Energy Commission s March 1997 *Policy Report on AB 1890 Renewables Funding*[8] remain important in maximizing the effectiveness of the funds provided by the RESIA:

1) To assist in developing a consumer-driven renewables market in California that facilitates consumers choice of renewable power.

2) To encourage market-based development of new and emerging renewable resources.

3) To maintain the benefits and diversity of the renewables industry and move towards market competitiveness with the broader electricity industry.

While these goals remain relevant, the combination of the RESIA, current high electricity prices, energy shortages, and legislative and regulatory uncertainty in California s energy markets affects how the Commission pursues these goals. The market is at a crossroads, and the ability of consumers to choose renewable electricity may be challenged or enhanced by changes in market structure. Consumers inclination to choose renewable products may be increased by the need for a hedge against electricity price volatility and uncertainty, or decreased in the face of uncertainty. Generators face similar concerns and issues: Will they continue to have a growing market outside long-term contracts? Will existing long-term contracts be altered in any way, or will new long-term contracts be required by policy makers?

Given these uncertainties, the allocations and investment methods proposed in this investment plan are structured to maximize the ability of the plan be responsive to changes in the market structure and price, so that the pursuit of the most cost-effective investments is ensured. In short, this draft investment plan is designed to build upon the successes of the REP, efficiently meet the objectives outlined in the RESIA, and remain as flexible as possible to ensure that the extended funds are used to support the most cost-effective and efficient investments in renewable resources.

Recommended Allocation of Funds

This draft investment plan recommends that the renewables funding flow through five Funds (expanding on the four Accounts established by Senate Bill 90 [SB 90] by explicitly dividing the Consumer-side Account into the Customer Credit and Consumer Education components.) The five Funds are as follows: the New Renewables Fund,

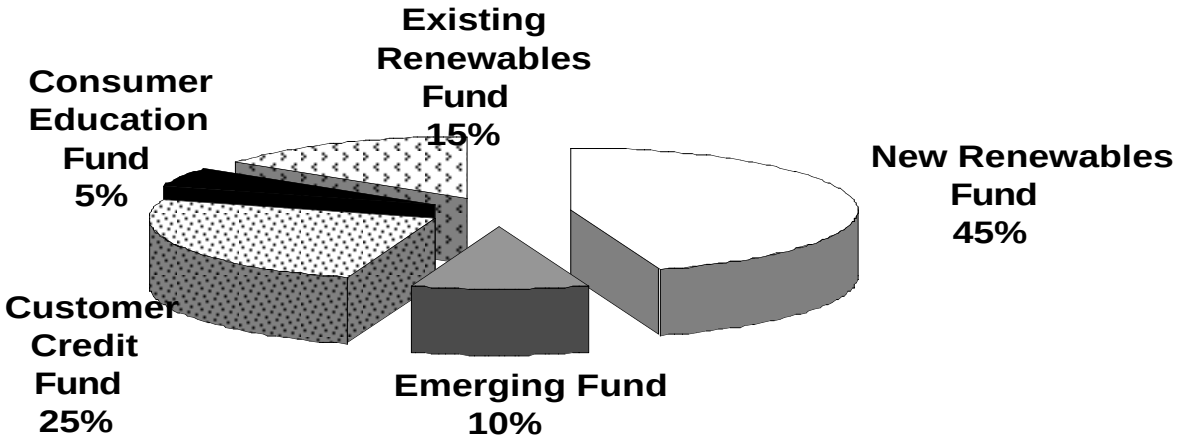
[8] Energy Commission publication number 500-97-002.

the Existing Renewables Fund, the Emerging Renewables Fund, the Customer Credit Fund, and the Consumer Education Fund.

The five funds cover all of the eight allocation categories described in the RESIA. The allocation categories that address incentives to reduce fuel costs for solid fuel biomass facilities, solar thermal generating resources, and existing wind generating resources are covered by the proposed Existing Renewables Fund.[9] The allocation for specified fuel cell technologies is covered in Chapter 8. In each of these allocation categories, the Energy Commission must still make determinations regarding the eligibility of the technologies, pursuant to the requirements in the RESIA.

Participants in the Committee s proceedings proposed widely varying allocations for the available funds. Some parties asserted that existing technologies should continue to be funded at the current levels in the REP, while others maintained that the main focus of the funding should be for new technologies. There was general agreement that the funding level for consumer education activities should be increased, and most of the emerging technology stakeholders stated that the allocation for emerging technologies should at least remain the same as in the current program. The Committee considered information presented by parties during the proceedings, information derived from administering the REP, and independent analyses of the renewable industry, in recommending the allocation among funds shown in Figure 2-1.

Figure 2-1
Recommended Allocation of Funds



New Renewables Fund

[9] The RESIA uses the term existing only with respect to the category existing wind generating r subd. (c)(8)). However, the Committee believes that the legislative intent for the solar therma categories was to consider support for existing power plants using those technologies, pursuant the RESIA.

The New Renewable Resources Account to date has been successful in substantially increasing investment in new renewable power plants in California. The Committee believes that significant additional investment is feasible and recommends allocating the greatest share, 45 percent, of the investment plan funds to this fund. This emphasis on investing in new renewable resources in California is supported by the RESIA, which asks the Energy Commission to set targets for and track the success of increased supply of renewable generation available from facilities not under existing contracts with utilities. In public workshops and submitted written testimony, stakeholders generally agreed that support for new renewable generation should be the primary focus of this investment plan. Furthermore, in the initial auction under the REP, the $162 million allocated to that Account was completely encumbered by prospective projects; in the second REP auction, which was funded with unused funds from the Existing Renewable Resources Account, the entire $40 million in auction funds was again encumbered, with several nominally eligible projects unfunded. All of this evidence supports the substantial allocation to the New Renewables Fund.

Emerging Renewables Fund

A secondary objective of the RESIA is to identify and support emerging renewable energy technologies that have the greatest near-term commercial promise and that merit targeted assistance. [10] The Committee believes that the emphasis on emerging technologies in the RESIA supports continuing the allocation for the Emerging Renewables Fund at the SB 90 level, 10 percent. However, the majority of the funds originally allocated to the Emerging Renewable Resources Account by SB 90 have not been used at present. Therefore, as the REP is extended, funded by the RESIA, a substantial amount of SB 90 funds will likely remain unused in the Emerging Renewable Resources Account. The Committee recommends that these unused funds be rolled over as an initial allocation for the Emerging Program in the extended program. Given this initial allocation and the rate at which funds have been encumbered in the Emerging Renewable Resources Account, the Committee does not believe that the Emerging Renewables Fund will need a full 10 percent allocation in the early years of the extended program. The Committee therefore recommends an annual allocation of extension funds for the Emerging Renewables Fund that begins at five percent and rises by 2.5 percentage points annually, averaging 10 percent over the five years. It is worth noting that the *Policy Report on AB 1890 Renewables Funding,* which was incorporated by reference in SB 90, recommended that the first $16.2 million of any rollover funds available at the end of the four-year transition period be used to augment the Emerging Renewables Fund. For the reasons noted, as well as the availability of RESIA funds, the Committee no longer believes this augmentation is necessary.

[10] /399.6, subd. (a)(2).

Customer Credit Fund

The Committee recommends that the Customer Credit Fund be allocated 25 percent of the extension funds. This allocation represents a slight increase from the 2001 funding level in the SB 90 program and reflects the fact that the SB 90 funds in this Account are likely to be completely distributed by the end of the program due to the increasing demand for renewable energy. The Committee believes, however, that this increased allocation will not be sufficient to continue the credit level at the current amount (1.0 cent per kWh) under scenarios where there is continued growth in the green market in California.[11] Accordingly, the Committee expects that changes in the credit level or fund eligibility may become necessary to avoid expenditures that exceed the allocation.

The Committee believes that the Customer Credit program remains a vital component of the long-term goal of a fully competitive and self-sustaining renewable energy industry in California. The Customer Credit program to date has assisted in building a market infrastructure that facilitates the sale of renewable energy outside utility contracts. Without the existence of this infrastructure, Californians would not have the current opportunities to stabilize their electricity costs at significant savings from market prices.[12] This nascent infrastructure, however, remains challenged by the market structure in California and the current uncertainty about that long-term structure. Without a continued Customer Credit program in the near-term, the developing market infrastructure is likely to withstand significant damage.

In the near-term, the Customer Credit program supports a developing market infrastructure and provides an incentive for the purchase of energy from renewable power that is both generated in-state and sold outside of a utility contract. It provides an incentive for electric service providers to develop contracts for the purchase of in-state renewable generation, to market renewable energy, and to capture consumers interest in renewable energy. This promotes the goal of the RESIA to increase the supply of generation from in-state resources other than those selling to investor-owned utilities (IOUs) under contracts entered into before 1996. In the long-term, consumer awareness of and demand for renewable power, along with companies that can supply that power in the retail market, are necessary for the success of the renewable industry, regardless of the market structure that eventually prevails. As the market grows and available resources become committed to renewable providers, the customer credit can help entice developers to create new sources of renewable energy. Therefore, the program addresses both short-term and long-term objectives of the RESIA.

[11] Growth in the green market is highly uncertain at present due to the dramatic change in energy prices this year and the prospects for a variety of changes to the market structure next year.

[12] Renewable power can be more easily sold in fixed-price products, since there is no connection to currently volatile fossil fuel prices. While only one such product exists at present, the potential exists for substantial savings for direct access customers as these options expand.

Consumer Education

Five percent of the funds are reserved for the Consumer Education Fund, whose purpose is to support consumer information, outreach, and marketing activities. Stakeholders generally agreed that the level of funding in the SB 90 program (one percent) was not adequate to substantially increase consumer awareness about renewable energy options. Evidence from the preliminary independent evaluation of the REP[13] indicates that there is a need to dramatically increase awareness of the benefits of renewable power and the options available to California consumers. The critical energy market events of the last six months reinforce the need to provide consumers with better information about their options for addressing high and volatile energy prices. At five percent, the funding is substantially less than comparable funding allotted for other public entity consumer awareness campaigns. However, the Committee feels that five percent is initially appropriate given the size and scope of the necessary activities within this fund.

Existing Renewables Fund

Finally, the Committee recommends that the Existing Renewable Resources Fund be allocated 15 percent of the funds. Generation from existing renewable power plants supports the objective of increasing, in the near-term, the quantity of California s electricity generated by in-state renewable energy resources. Should existing generation decrease, it would be more difficult to achieve the expected increases with new generation. Continuing assistance to existing renewable facilities is also justified because none of the cost-shifting measures envisioned during the development of SB 90 have occurred.[14] In addition, the reliability and environmental benefits provided by these technologies remain important to Californians, particularly as the State experiences electricity supply shortages.

At the same time, the allocation to existing technologies is reduced from SB 90 levels because the RESIA envisions fewer existing renewable technologies included in the fund while establishing additional eligibility criteria (to be determined by the Energy Commission). The participating technologies have also made strides in improving cost-effectiveness since the SB 90 program was established. Furthermore, energy prices are expected to be higher during the five-year period covered by this investment plan, leading to a reduced need for support for existing generators.

The Committee believes that the existing renewable generators provide substantial reliability benefits in the near-term, and therefore adequate funds should be allocated to ensure these benefits in the first years of the program. Because the existing technologies are expected to continue to improve their cost-effectiveness through cost reductions combined with higher market prices for energy over time, and because the reliability benefits provided by existing renewable generation may be less significant in

[13] Renewable Energy Program Preliminary Evaluation, Regional Economic Research, Inc., Oc

[14] Other than the recent Assembly Bill 2825 incentives, which were structured to replace, not reduce, REP incentive payments.

the long-term, funds allocated ramp down from 20 percent initially to 10 percent in the fifth year of the program.

In addition to the above allocations of extension funds, the Committee proposes that the rollover from each SB 90 Account (or Subaccount) be allocated to the corresponding fund within the extended program. As stated earlier, the Committee does not believe that the first $16.2 million of any rollover funds (three percent of the $540 million) needs to be allocated to the Emerging Renewables Fund as recommended in the *Policy Report on AB 1890 Renewables Funding,* given the availability of unused Emerging Renewable Resources Account funds, the rate at which Account funds have been encumbered, and the availability of extension funds under RESIA.

Timing of Funds and the Need For Flexibility

The Committee re-emphasizes that the recommended allocation of funds is a direct result of a vastly different electricity market than the one in 1997, when the *Policy Report* was developed. There is greater uncertainty today about the market structure within which the investment plan must operate. Events of the past summer clearly will lead to unforeseen changes in the market structure in California. Accordingly, since the expected changes could dramatically affect the cost-effectiveness and usefulness of funding in the five funds, the Committee recommends that the Energy Commission be given the flexibility to make appropriate adjustments in the investment plan allocations and structures. The Committee believes that such adjustments may even be required before the beginning of the extended program in 2002, in reaction to changes in market structure in 2001.

Despite the current uncertainty, the Committee has developed a schedule for the allocation of funds over the five-year funding period (see Table 2-1 and Figure 2-2). Funds allocated to the Emerging Renewable Resources Fund and the Existing Renewable Resources Fund ramp up and down, respectively. The Emerging Renewables Fund allocation ramps up to reflect the lesser expected need for the funds at the beginning of the program. At the same time, the Existing Renewables Fund allocation ramps down to reflect the greater expected system reliability benefits of providing assured funding to these resources at the beginning of the program, as well as the expectation of decreased need for funding at the end of the program. The annual allocation of funds to the remaining funds remains constant throughout the five-year program period.

Table 2-1
Allocation to Funds by Year

	2002	2003	2004	2005	2006	Overall
New Renewables Fund	45.0%	45.0%	45.0%	45.0%	45.0%	45%
Emerging Renewables Fund *	5.0%	7.5%	10.0%	12.5%	15.0%	10%
Customer Credit Fund	25.0%	25.0%	25.0%	25.0%	25.0%	25%
Consumer Education Fund	5.0%	5.0%	5.0%	5.0%	5.0%	5%
Existing Renewables Fund *	20.0%	17.5%	15.0%	12.5%	10.0%	15%

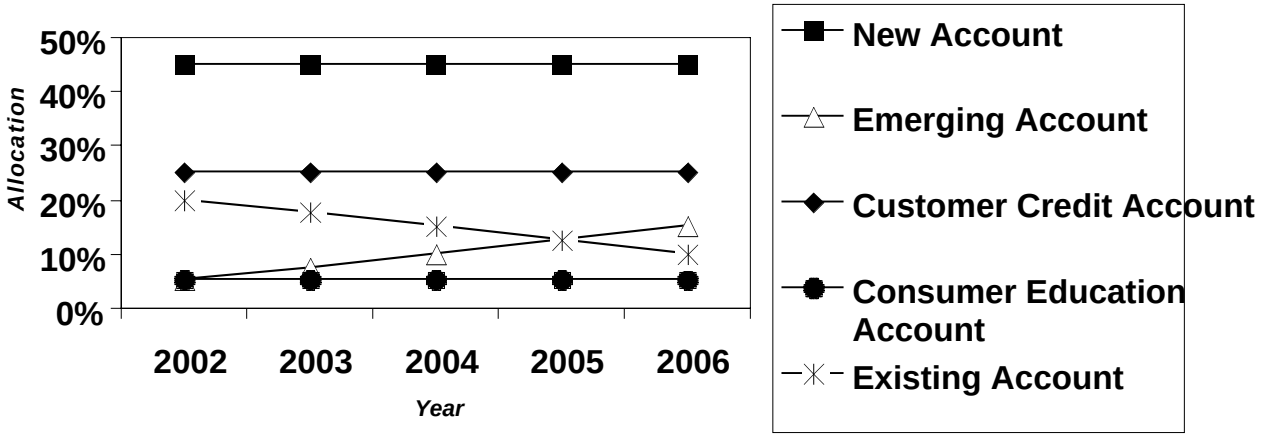
* Does not include rollover funds from SB 90, which would increase the effective allocation to these funds.

This draft investment plan has the overall goal of achieving a sustainable supply of renewable energy, thereby providing Californians with increased system reliability, adequate resource diversity, improved environmental quality, and economic development. To achieve this goal, it is essential that the investment plan be flexible enough to respond to changes in the market. Most parties attending the workshops agreed that the approach used in the REP, the use of guidelines that can be periodically revised through a public process, is the most effective way to administer the funds. This approach has enabled the program staff to make mid-course corrections in the REP in response to unanticipated events in the marketplace. The ability to respond quickly to changes in the electricity market ensures that the program remains market-driven while reducing the likelihood of participants more funds than needed when market prices rise unexpectedly, as they did during the summer of 2000.

One area where the Energy Commission s flexibility has been limited, however, is the ability to reallocate funds at regular intervals, in reaction to market conditions. SB 90 directed that reallocation of funds only occur at or near the end of the program, and only if the Energy Commission could reasonably determine that the money reallocated to a Fund would not be needed in that Fund by the end of the program. The events of the past year have shown how quickly the market can change. Given the current uncertainty, the rapidity of changes in market conditions, and the five-year term of the program, the program must be able to move funding from one area to another, as market conditions demand.[15]

[15] One example of the flexibility the Energy Commission proposes was considered allowable only near the end of the SB 90 REP. In November 2000, the Existing Renewable Resources Account had a large amount of rollover funding because of high market prices for energy during June — November 2000. After a worst-case analysis by the staff concluded that the Existing Renewable Resources Account would not use these funds by the end of 2001 (the end of the current program), the funds were made available for an expedited auction for new renewable resources. Rather than sitting idle, the funds were used to assist approximately 470 MW of new generation that can potentially

Figure 2-2
Ramping of Allocations



As mentioned earlier, the Committee believes that the shortages, high prices, and consequent prospects of regulatory change in the electricity market require flexibility in reexamining program allocations. The current unprecedented prices for electricity in the State may lead to a rapid expansion in demand for both the Emerging Renewables and Customer Credit Funds. Legislative and/or regulatory decisions could challenge the existence of the market infrastructure that delivers the benefits of these funds to consumers. High natural gas prices, if they are sustained in the market for some period, would tend to limit payments from the Existing Renewables Fund and increase demand for funds from the New Renewables Fund. In the investment plan workshops, some stakeholders recommended that higher allocations to Existing and Emerging Renewables Funds be accompanied by automatic rollovers of unused funds to the New Renewables Fund on an annual basis. The Committee believes that this proposal, while appealing because it furthers the legislative goal of focusing funds on new renewable power plants, has the disadvantage of limiting, rather than enhancing, program flexibility. In the extension program, therefore, the Committee proposes that allocation flexibility be established as follows:

1) The Energy Commission shall, through a public process, make decisions about reallocating funds based upon the latest information on current and anticipated market conditions as part of the biennial report required by SB 90, commencing with the 2002 report.

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come on-line by the end of 2001 or sooner, adding to California s electricity supply. However, such reallocation could not have occurred earlier in the program under the constraints of SB 90. In addition, while additional funds from the Existing and Emerging Accounts are potentially idle at this time, the Energy Commission does not believe these funds can be reallocated at this time under the constraints of SB 90.

2) Between reallocation decisions, money in each Fund shall remain in that Fund and rollover in subsequent years.

3) The Energy Commission should have the authority, as in the SB 90 program, to transfer money among Funds (which would then be repaid) if required, given any approved changes in allocation.

Eligibility and Exclusions

The proposed eligibility and exclusions for funding support for each Fund are summarized in Table 2-2. These eligibility and exclusions are similar to those within the SB 90 program, with some changes as noted below. Changes in eligibility criteria will apply to the RESIA funds and to all unused SB 90 funds that are rolled over into the extension program. SB 90 funds that are encumbered through the SB 90 program, however, will continue to follow the SB 90 eligibility requirements until those funds are either disbursed or are made available for reallocation.

New Renewables Fund

Within the New Renewables Fund , the Committee is considering eligibility changes that would allow on-site generation that can be properly measured and accounted for and generation from two types of projects that are located outside California: (1) projects interconnected to the grid within California and isolated from local interconnection in their areas, and (2) those connected in the WSCC grid area with guaranteed contracts to sell their output to California loads. The Committee also recommends that utility-owned projects be eligible, and that competitive transition charge (CTC) considerations be disregarded when determining program eligibility. The Committee recognizes that in some cases, these changes will require legislative action to alter the requirements governing the REP.

Table 2-2
Eligibility for Funding

Fund	Eligibility Criteria
New Renewable Resources Fund	Eligible electricity must be from projects that meet the following criteria: • Newly built, according to criteria established in each auction. • Either (a) wholly located in California, or (b) partially or wholly located outside of California, but interconnected to the grid in California, and with no possible other interconnection outside the State. • Meet the requirements established in the extension legislation regarding facilities that repower while keeping existing long-term contracts with an existing IOU as specified in each auction. • Not have an active award from a previous auction by a date certain established as an auction criterion for each auction.
Emerging Renewable Resources Fund	Eligible systems must meet the following criteria: • Photovoltaic, solar thermal, small wind (50 kW or less), or fuel cells using renewable fuel, and other technologies as identified by the Commission. • Located on the premises of the end-user and be primarily designed to offset the customer s own load. • Grid-connected (as defined herein) and receive IOU distribution service (COU service if opt-in to fund).
Customer Credit Fund	Eligible electricity must meet the following criteria: • Be sold to eligible end-use customers (within distribution service territory of utility collecting the public goods surcharge) through a direct-access transaction. • Be sold through a renewable provider registered with the Energy Commission. • Not sold to a public entity.
Consumer Education Fund	Eligible participants must meet the following criteria: • Either (a) non-profit agency with mission or expertise consistent with goals and purpose of the Renewable Energy Consumer Education Program; (b) individual or company with marketing, public relations, consumer education, or public interest marketing experience; or (c) public agency with experience or expertise in the above topics. • Comply with the criteria contained in Energy Commission solicitations announcing funding availability for this Fund.
Existing Renewable Resources Fund	Eligible generation must meet the following criteria: • Be from facilities using solid-fuel biomass, solar thermal, or wind technology that are found by the Energy Commission to meet the criteria established in the extension legislation. • Be from facilities that either are (a) wholly located in California or (b) partially or wholly located outside of California, but interconnected to the grid in California, and with no possible other interconnection outside the State. • Not be receiving fixed energy price payments under a long-term contract with an existing IOU. • Not be energy for use on-site. • Not receiving funding from the Emerging or New Renewables Funds.

On-site generation was previously disallowed from funding eligibility for the New Renewable Resources Account in SB 90. The Committee recommends allowing on-site generation because the reliability, environmental, and local economic benefits of renewable generation that is used at grid-connected sites are equivalent to the benefits of generation that is sold in the market. Generation used on-site can also help to provide local system reliability and defer costly transmission and distribution system upgrades, thereby reducing system costs. To be eligible, on-site systems must develop and provide independent metering and submit monthly invoices with assurances equivalent to energy sold to the grid.
The Committee recommends that landlocked out-of-state facilities be eligible for Funding from the New Renewables Fund because it is clear that these facilities are similar, in nearly all respects, to facilities within California.[16] These facilities are likely to provide the same system, environmental, and even much of the local economic benefits that in-state renewable power plants bring to California. The Committee is also considering extending eligibility to out-of-state facilities with guaranteed in-state sales because of California s need for additional power. The Committee recommends that the restrictions on utility ownership and on sales to customers avoiding the CTC be dropped, because these exclusions are no longer necessary in a world where most of the in-state utility generation has been divested and the four-year transition period (when most of the CTC was to be collected) is over.

The Committee recommends that additional eligibility criteria be established in specific proposed auction solicitations. For example, the on-line date after which a project in a particular auction is eligible must be determined once the auction date itself is established, guided by the general principle that projects built and operated before the auction date should not be eligible for funding. Also, projects should be considered ineligible in an auction if, by a determined date, they hold an active award from a previous auction.

Emerging Renewables Fund

For the Emerging Renewables Fund , the Committee proposes several expansions of eligibility. The Committee believes that the objectives of the RESIA and the experience of implementing the SB 90 program support these expansions. With significant SB 90 funds in this Account unused at present, the Committee believes that reasonable expansions of eligibility are necessary to foster the goal of increased quantity of California electrical generation produced from emerging resources. Again, the Committee understands that some of these changes will require legislative action to alter the specifics of the law applying to the REP.

First, the Committee notes that the RESIA establishes an objective of identifying, as well as supporting, emerging renewable resource technologies. Therefore, the Committee proposes that other technologies be considered under the extension program, in addition to the four technologies established as emerging by SB 90 —

[16] The term landlocked refers to out-of-state facilities that can only connect physically to the grid within California.

photovoltaics, small wind, solar thermal (electric), and fuel cells that use a renewable fuel. To identify other prospective emerging technologies, the Committee proposes to revive the criteria and process for determining technology eligibility proposed in the *Policy Report on AB 1890 Renewables Funding*. The Committee will consider the need to update these criteria given the experience with the SB 90 program and the market conditions at that time. Possible technologies that could be identified with this process include microturbines that use a renewable fuel and specified non-renewable fuel cells, pursuant to the Energy Commission s findings on these technologies.

A second expansion of eligibility the Committee proposes is to change the definition of small wind to systems that are 50 kilowatts (kW) or less, rather than the present 10 kW or less, to capture the benefits of the latest technological advances in small wind turbines. The Committee proposes that the overall definition of small versus medium and large systems also change, so that photovoltaic and other emerging systems less than 50 kW be considered small systems. This change will allow more small and medium-sized businesses to participate in the program and reduce the volatility and amount of their energy costs.

A third proposal is to allow utility ownership of emerging systems. In an era where utilities no longer own extensive generation resources, concentrating instead on the regulated distribution business, the Committee believes that prohibition of utility ownership is overly restrictive. Accordingly, the Committee proposes that both IOU and customer-owned utility (COU) ownership of emerging systems be allowed in the extended program. Eligible systems must still be sited within the distribution service areas of the IOUs contributing to the program. However, should a customer-owned utility opt to contribute an amount to the REP proportionate to the funds provided by the IOUs, the Committee proposes that their customers be eligible to receive funding for emerging systems.

Finally, the Committee proposes to expand and clarify the definition of grid-connected to include those applications that are not physically connected to the grid, but where the documented cost of establishing a physical connection is less than the unsubsidized cost of the eligible emerging system.

Customer Credit Fund

For the Customer Credit Fund, the Committee proposes several changes in eligibility. First, the Committee is considering extending eligibility to out-of-state renewable facilities. These facilities are providing clean power to California consumers at a time when it is sorely needed. Second, the RESIA explicitly prevents public entities from being considered eligible customers for the purposes of participating in the Customer Credit Fund. In addition eligible customers must still reside in the distribution service areas of IOUs contributing to the program. However, should a customer-owned utility opt to contribute an amount to the REP proportionate to the funds provided by the IOUs, the Committee proposes that their customers be eligible for customer credits.

Additional eligibility constraints on the Customer Credit Fund may be reasonable to specifically target the credit to provide the most cost-effective near-term benefits, while continuing to pursue the long-term goal of developing the infrastructure to support a fully competitive renewable industry. For example, a restriction that the credit be paid only to products with a minimum amount of new generation content may be considered. To ensure the realization of consumer information and education benefits from the Customer Credit assistance, the Energy Commission may consider requiring entities dispersing the credit to send educational materials about renewable energy to their customers (either those developed by the Energy Commission, by the entity, or both), or requiring that such entities provide their customer lists to the Energy Commission so that the Energy Commission can itself send materials to these customers. Eligibility may be further restricted if demand for funds exceeds availability.

Existing Renewables Fund

The Committee believes that the RESIA restricts support for existing technologies to existing solid-fuel biomass, solar thermal, and wind resources.[17] Existing here has the same meaning as in the SB 90 program — facilities built and generating power for sale before September 26, 1996.[18] The RESIA also requires the Energy Commission to make findings concerning the eligibility of these resources. First, the Energy Commission must determine that existing solar thermal resources enhance the environmental value and reliability of the electricity system and require financial assistance to remain viable. Second, the Energy Commission must determine that existing wind facilities are a cost-effective source of reliability and environmental benefits compared with other eligible sources, and that they need financial assistance to remain economically viable. Finally, the Energy Commission must determine that solid-fuel biomass facilities provide demonstrable environmental benefits in the form of air quality improvement. While the Committee has recommended an allocation for the Existing Renewables Fund , it has not yet made the required findings. When these findings are made, the allocation amount for the Existing Renewables Fund may require adjustment.

Consumer Education Fund

The Committee recommends that eligibility for participation in the Consumer Education Fund remain substantially the same as established for the SB 90 program.

[17] The RESIA uses the term existing only with respect to the category existing wind generating resources (*399.6, subd (c)(8)). However, the Commission believes that the legislative intent for the solar thermal and biomass categories was to consider support for existing power plants using those technologies, pursuant to the conditions established by the RESIA.

[18] The Committee recognizes that at some point in the 10-year duration of RESIA, the definition of existing may require modification to avoid unequal treatment of facilities.

Numerical Targets

This investment plan is expected to contain numerical targets, or projections, of the impact of the investment plan on the increased quantity of California electrical generation produced from overall renewable resources and from two subcategories established by the RESIA. The first subcategory is California generation from emerging technologies, and the second subcategory is increased supply from facilities other than those selling to IOUs under contracts entered into before 1996 and pursuant to PURPA (the standard offer and similar negotiated contracts). The RESIA requires the Energy Commission to evaluate progress annually toward meeting the established targets and assess the impact on reducing the cost to Californians of renewable energy generation.

One difficulty in establishing these targets arises from the variety of market variables, in addition to the incentives proposed in the investment plan, affecting the development and continuing operation of renewable power plants. Technological changes, conventional generation prices, market structure, general economic growth, consumer attitudes, and ingrained standard business practices are variables outside the immediate influence of the program. For example, if natural gas prices remain high and are reasonably projected to remain high for some time, existing, emerging, and new renewable generation will tend to fare better in the market. The incentives in the investment plan can help these resources take advantage of the favorable market conditions, but it may be difficult to separate the effect of the conditions from the influence of the program. However, if natural gas prices drop back to historic levels, the renewable industry may face challenges in developing and maintaining generation under such adverse conditions. In that case, the program incentives could be ineffective, and targets consequently difficult to achieve.

It is challenging to design targets that reflect this uncertainty. Targets designed assuming adverse market conditions may seem low if beneficial market conditions prevail, and an objective evaluator would not necessarily determine that the program was a success. On the other hand, targets designed assuming beneficial market conditions may seem too aggressive if market conditions are adverse, and an objective evaluator would likely determine that failure to meet these aggressive targets should not be taken to indicate program failure.

While the RESIA requires the investment plan to set targets as described, it leaves many open questions about the timing or structure of these targets. Should they be annual targets, representing a projected path toward a long-term goal, or an end-point goal, allowing variances in the intermediate path? Should the targets be set once, in this plan, and then not modified as the plan is implemented, or does the Commission have the power to alter the targets in response to market conditions?

The Committee recommends that the targets include capacity in addition to generation, because increased capacity seems a more appropriate goal for the Emerging and the New Renewables Funds. The Committee recommends that a range of targets be set, representing beneficial and adverse circumstances, for the amount of increased

generation by the year 2006, which is the end date of the program. Finally, the Committee recommends that the targets be adjustable in the biennial reports, so that ongoing market conditions can be reflected and program performance can be accurately judged. The Committee invites comments and suggestions on methods to establish targets.

Program Administration

The Legislature has selected the Energy Commission to develop this investment plan recommending allocation of the renewables funding. The Committee recommends that the funds be placed in the Renewable Resource Trust Fund established by SB 90 and continue to be administered by the Energy Commission with appropriate funding for administration approved through the Commission s regular budgetary process. Authority for administration and related activities should be made explicit by the Legislature.

Reporting Requirements

The Energy Commission is required by SB 90, the Supplemental Report of the 1999 Budget Act, and the RESIA to provide a variety of reports to the Legislature and Governor. These reports are as follows:

- The Energy Commission must submit quarterly reports to the Legislature describing the awards from the REP, cumulative commitment of claims by account, the relative demand for funds by account, a forecast of future awards, and other matters the Energy Commission determines may be of importance to the Legislature. (/445, subd. (g))

- The Energy Commission must submit an annual report to the Legislature describing the status of any transfers of funding or repayments between accounts. (/383.5, subd. (g))

- The Energy Commission must submit an annual report to the Legislative Analyst s Office beginning March 1, 2000 and then on each December 1 thereafter including itemized lists of projects awarded funding in the current and prior fiscal years.

- The Energy Commission must submit a final report of its independent evaluation of the REP to the Governor and the Legislature no later than March 31, 2002. the independent evaluation is to be coordinated with the Department of Finance s annual report and the Energy Commission s biennial report (both of which are described above). The final report is to include legislative and non-legislative recommendations concerning improvements in funding, administration, and program scope, if the report recommends a continuation of the REP. (Stat. 1999, Ch. 50, Item 3360-01-0465, provision 2)

- The Energy Commission must submit a biennial report to the Legislature beginning May 31, 2000, and on or before May 31 of every second year thereafter, including description of allocation of funds between accounts, the need for reallocation of funds among accounts, and the allocation of funds from the interest on the Renewable Resource Trust Fund. (/383.5, subd. (g))

- The Department of Finance must conduct an independent audit of the Renewable Resource Trust Fund and provide an audit report to the Legislature beginning March 1, 1999 and not later than March 1 of each year thereafter. (/445, subd. (h))

- On or before January 1, 2004, the Governor must appoint an independent review panel of members with expertise in the energy field. This panel is required to prepare a report evaluating the energy efficiency, renewable energy, and research, development and demonstration programs funded by the RESIA, by January 1, 2005. (/399.8, subd. (F))

The Committee believes that some of these reporting requirements are duplicative and unneeded. The Committee, therefore, proposes consolidating the Energy Commission s quarterly and annual reports into (1) semi-annual reports containing the information previously submitted in the quarterly and annual reports to the Legislature, and (2) biennial reports containing evaluation of program performance and recommendations for reallocation and program changes.

Inflation Adjustments

The RESIA requires adjustments in the annual funding for the program at the lesser of the annual growth in electric commodity sales or inflation, as defined by the gross domestic product deflator. [19] The manner in which the annual funding changes are determined and included in the Renewable Resource Trust Fund must still be worked out. Some questions remain to be answered, such as how to calculate electricity growth and whether that term includes direct access usage, customer-owned utility usage, or self generation. It is also unclear if the funding would be adjusted downward if electricity usage fell.

Many stakeholders stated that some of the program components — such as price caps, target prices, or incentive rates — should be adjusted for inflation as well. The Committee is not inclined to have these program components adjusted for inflation, for reasons explained in the individual Fund chapters.

Mandated State Purchase of Renewable Energy

The RESIA states that the investment plan shall also include an evaluation of and report to the Legislature regarding the appropriateness and structure of a mandatory

[19] /399.8, subd. (d)(2).

State purchase of renewable energy. [20] State facilities (with the exception of the University of California and California State University campuses) receive bundled service from their local utility distribution companies (UDCs), which can be either IOUs or municipal utilities. According to comments submitted by the California Department of General Services (DGS), the State s experience with renewables in the direct access market has been less than encouraging. Although renewable generation products are available through the DGS 1997 Master Services Agreement for electricity services, these products are typically priced higher than conventional generation products. State procurement rules do not allow State agencies to purchase goods or services at above-market prices except in special circumstances. In addition, the DGS electricity services program is voluntary; most customers who approached the program were looking for some type of discount from their current electricity service and were therefore not interested in higher-priced renewable products.

Because of the institutional and legal barriers of a State-mandated purchase of renewable generation, the Committee is exploring alternative options. One possibility would be for the State to develop renewable, grid-connected distributed generation technologies at its own facilities. This option would add electricity capacity to California s power supply while offsetting the State s power consumption at those locations. In addition, this option would help stimulate the market for renewable technologies by providing demand for these products. Systems installed at State facilities that meet the eligibility requirements would also be eligible for buydowns from the Emerging Renewables Fund. This would reduce the cost to the State of the systems while increasing the likelihood of meeting the State s procurement rules regarding least-cost purchases of goods and services. For the same reasons, local governments, schools, and other public entities should be encouraged to develop renewable, grid-connected distributed generation technologies at their respective facilities. The Committee will continue to evaluate this issue as the investment plan is developed.

To encourage this type of development, the Committee will also evaluate whether these public entities should be exempt from the residency requirement included in SB 90, and allowed to qualify for Emerging Renewables Fund funds even though they are located outside the service territories of participating IOUs.

[20] /399.6, subd. (e).

CHAPTER 3

NEW RENEWABLE RESOURCES

Recommended Allocation

The Electricity and Natural Gas Committee recommends allocating 45 percent of the Reliable Electric Service Investments Act (RESIA) funding, or $303.75 million without considering other contributions or inflation adjustments, to production incentives for new in-state renewable electricity generation technologies. The allocation of 45 percent is based both on the objectives of the RESIA and on public comments received during the investment plan development process. According to the RESIA , the first objective of the investment plan shall be to increase, in the near-term, the quantity of California s electricity generated by in-state renewable energy resources . . . [21] The most straightforward way to meet this objective is to bring new renewable generation on-line and allow existing renewable generation to repower (thereby increasing efficiency and output). Parties who provided comments also generally agreed that the first priority in meeting the goals of the RESIA is investment in new and repowered renewable electricity generation.

The New Account to date has been successful in substantially increasing investment in new renewable power plants in California. In the initial auction under the Renewable Energy Program (REP), the $162 million allocated to the New Renewable Resources Account was completely encumbered by prospective projects. In the recently-concluded second auction, which was funded with unused funds from the Existing Renewable Resources Account, the entire $40 million in auction funds was encumbered, while several nominally eligible projects remained unfunded. The results from these two auctions also support the proposed 45 percent allocation to the New Renewables Fund.

The high initial allocation to new renewable technologies will allow the program to fund a large amount of new capacity, while the built-in program flexibility will allow those funds to be redistributed elsewhere if the expected new capacity does not fully materialize. Table 3-1 shows the annual allocations proposed for the New Renewables Fund , along with expected rollover from Senate Bill 90 (SB 90) funds.

Description of Fund

The New Renewable Resources Fund will provide new projects with generation-based production incentives. These incentives will be awarded through competitive auctions similar to the two auctions for new renewable resources conducted under the REP. These two auctions had largely similar structures and rules. The differences were

[21] /399.6, subd. (a)(1).

reflections of the different market conditions, timing, and purpose at the time of each auction. The Committee proposes that much of the structure of REP auctions be kept in the RESIA auctions, including the basic first-price structure, the use of caps, limits on the duration of payments to establish the market as the main source of revenue for new projects, and the flexibility to design the specifics of the auctions to reflect goals and conditions relevant when each auction is held.

Table 3-1
Allocations to the New Renewable Resources Fund By Year

SB 90 ROLLOVER ESTIMATE[22]	2002	2003	2004	2005	2006	Overall[23]
	45.0%	45.0%	45.0%	45.0%	45.0%	45%
$0.33 Million	$60.75 Million	$60.75 Million	$60.75 Million	$60.75 Million	$60.75 Million	$305.08 Million

Stakeholders proposed alternative auction structures during the investment plan development process that would prevent paying production incentives when market prices are high. Two possible strategies were proposed, both borrowing from the target price concept used in the Existing Renewables Fund. The first strategy would have prospective developers bid target prices, rather than incentive amounts, with subsequent payments of a standard incentive amount limited by the target prices bid in the auction. The second strategy would keep the incentive amounts bid as in the SB 90 auctions but establish an index amount, or target price, above which the incentives as bid would not be paid.

At this time, the Energy Commission has not evaluated these methods sufficiently for the Committee to propose altering the structure used in previous auctions. However, the Committee recognizes that the unexpectedly high electricity prices seen this summer and fall may require a structure that would tie payments more closely to market prices to avoid providing incentives during times when market prices provide adequate project support. The Energy Commission will continue to evaluate alternative auction structures for use in the RESIA auctions as the investment plan, subsequent program guidelines, and Notice of Auction protocols are developed.

Eligibility for Funding

The Committee recommends that, as in the SB 90 program, eligible generation must come from facilities that are renewable, new, in-state, and free of active participation in

[22] The rollover estimate reflects funds from one winning project that cancelled its awar 2000. Other projects may end up canceling or being unable to generate sufficiently to awards; should this happen, rollover would be greater.
[23] The percentages under the years 2002 through 2006 do not include the rollover estimat amounts do not include other contributions or inflation adjustments.

a previous auction. Several changes in the definitions of these terms for purposes of New Renewables Fund eligibility are proposed in this investment plan. In addition, certain specific eligibility criteria are best established in the proposed individual auction solicitations. For example, the on-line date after which a project in a particular auction is eligible must be determined once the auction date itself is established, guided by the general principle that projects built before the auction date should not be eligible for funding.

The Committee recommends the following eligibility changes from SB 90:

- allowing on-site generation
- allowing generation from projects that are outside California, but are interconnected to the grid within California, and isolated from local interconnection in their areas (landlocked facilities)
- allowing generation from projects that are outside California, but have guaranteed contracts to sell their output to California customers
- allowing utility ownership of facilities
- disregarding competitive transition charge (CTC) considerations when determining program eligibility
- allowing generation from facilities that continue to have standard offer contracts with fixed capacity prices so long as those facilities have repowered as required to be considered new and the generation meets the requirements set forth in the RESIA

These recommended eligibility changes will provide additional reliability, environmental, and local economic benefits from newly-eligible renewable generation. In the case of self-generation and landlocked facilities just outside of California, these benefits are largely equivalent to those from facilities already eligible; further, with independent metering information available, there is no reason to exclude these facilities. In the case of utility ownership and CTC constraints, the Committee believes that these barriers to participation have little or no justification in the post-2001 electricity market.

Regarding repowered facilities still in contracts with fixed capacity payments, the RESIA establishes that facilities with power purchase contracts with an electrical corporation originally entered into before September 24, 1996 are eligible for New Renewables Fund payments if all of the following conditions are met:

1) The project's power purchase contract provides that all energy delivered and sold under the contract is paid at a price that does not exceed California Public Utilities Commission-approved short-run avoided cost of energy.

2) Either of the following:

- The power purchase contract is amended to provide that the kilowatt hours (kWhs) used to determine the capacity payment in any time-of-delivery period in any month under the contract shall be equal to the actual kWh production, but no greater than the five-year average of the kWhs delivered for the corresponding time-of-delivery period and month, in the years 1994 to 1998, inclusive.
- If a project's installed capacity as of December 31, 1998 is less than 75 percent of the nameplate capacity as stated in the power purchase contract, the power purchase contract is amended to provide that the kWhs used to determine the capacity payment in any time-of-delivery period in any month under the contract shall be equal to the actual kWh production, but no greater than the product of the five-year average of the kWhs delivered for the corresponding time-of-delivery period and month, in the years 1994 to 1998, inclusive, and the ratio of installed capacity as of December 31 of the previous year, but not to exceed contract nameplate capacity, to the installed capacity as of December 31, 1998.

3) The production incentive is payable only with respect to the kWhs delivered in a particular month that exceeds the corresponding five-year average calculated pursuant to clause 2.

This language specifically refers to existing facilities that wish to repower or add separable improvements consistent with new Fund eligibility, but which continue to have energy delivered under a contract that pays fixed capacity payments to the facility (in SB 90 auctions, such prospective repowers/additions were required to get out of their standard offer contracts). The additional generation is eligible for funding from the New Renewables Fund only to the extent that it does not receive any capacity payments, unless the capacity of the facility has expanded by a significant amount within the constraints of the contract and to the extent that it represents generation above a calculated historical amount for the facility.

Recommended Distribution Method

Funds will be distributed through a cents per kWh production incentive, capped at 1.5 cents per kWh, paid to auction winners once projects have been constructed and are on-line generating electricity. Winning bidders in each auction will have a specific deadline for coming on-line, and payments will be made for five years from the on-line date.

The Energy Commission recommends holding biennial auctions for new renewable resources rather than annual auctions or a single auction for all available funds. Holding fewer auctions could result in bidders simply raising their bids to take advantage of the higher amount of funding available. However, annual auctions could limit the amount of funding available for larger projects (such as geothermal facilities), particularly if a given project was limited to no more than 25 percent of the funds from each auction as is currently required under SB 90. A biennial timeframe gives project

developers the certainty of regular auctions while providing enough funding per auction to support a variety of technologies and project sizes. Biennial auctions would also spur new advances in renewable technology developments by making future funding available for new projects that incorporate these advances.

Potential Changes in Fund Over Time

Although it is unclear at this time how much interest there is in building new renewable generation in California, an evaluation of renewable technologies conducted by the Energy Commission in 1991 indicated technical potential for more than 15,000 MW of biomass, geothermal, small hydro, solar, and wind capacity in California.[24] The most recent New Account auction (November 15, 2000) also indicates that there is a willingness to develop new renewable projects, with more than 650 MW of capacity bidding to come on-line by December 2001. If, however, the development of new renewable projects loses momentum and developers bid less capacity into future auctions, the Energy Commission will still have the ability to reallocate funds set aside for new renewables to other areas within the program that may be oversubscribed.

Several stakeholders stated that the cap on incentive bids in the New Renewables Fund should be higher than the 1.5 cents per kWh cap in place in the two SB 90 auctions. Given the response to the past two auctions, the expectation for higher market prices in the near- to mid-term and the continued potential for cost-reduction in renewable technologies, the Committee is not convinced of the need to raise the cap. The Committee, therefore, recommends that the 1.5 cents per kWh cap be continued for any auctions held with the RESIA funds. However, specific auction criteria may specify a lower cap if the market conditions seem to warrant such a change for a specific auction.

Finally, some stakeholders suggested that the cap for each auction (or other monetary criteria in an auction, such as a target price in a different auction structure) should be adjusted for inflation. Given that inflation will likely lead to higher market prices for energy to the same extent as increases in project costs, and that the incentive provided should be small in proportion to market revenue for a project, the Committee disagrees with this recommendation. In addition, keeping the cap constant encourages the continuing improvement of renewable industry cost effectiveness, and reflects the market-based nature of the program: the incentives act to encourage market development of new projects and inflation adjustments are left to the market to internalize in costs and revenues.

[24] Technical Potential of Alternative Technologies - Final Report prepared for the Energy Commission by Regional Economic Research Inc. under contract No. 500-89-001, December 2, 1991.

CHAPTER 4

EXISTING RENEWABLE RESOURCES

Recommended Allocation

The Electricity and Natural Gas Committee recommends allocating 15 percent of the Reliable Electric Service Investments Act (RESIA) funding, or $101.25 million, without considering other contributions or inflation adjustments, to production incentives for existing renewable technologies, specifically solid-fuel biomass, solar thermal, and wind technologies.[25] The Committee feels that it is necessary to allocate sufficient funding to existing renewable technologies to prevent facilities from shutting down or reducing their generation, particularly given the objectives of the RESIA to increase generation from in-state renewable resources and provide system reliability. At the same time, the allocation has been reduced from Senate Bill 90 (SB 90) levels because there are fewer eligible existing renewable technologies, and those technologies have improved their cost-effectiveness since the SB 90 program was established. In addition, energy prices are expected to be higher over the five-year period covered by this investment plan, reducing the need for additional assistance.

Because existing technologies are expected to improve in cost-effectiveness over time and because the reliability benefits provided by existing renewable generation may not be as significant in the long-term, funds allocated to existing technologies ramp down from 20 percent in the first year to 10 percent in the fifth year of the program. Table 4-1 shows the annual allocations proposed for the Existing Renewables Fund, along with expected rollover from SB 90 funds.

Although the proposed allocation to existing technologies falls below industry requests, the allocation is well within the staff s estimates of required funding assistance based on forecasts of market prices and historic generation by these technologies during the SB 90 program. The Committee also recommends that any unexpended funds from a particular month should be rolled over to the following month within the same tier until the Energy Commission determines whether funds should be reallocated through a public process based upon the latest market conditions.

[25] The RESIA uses the term existing only with respect to the category existing wind ge resources (/399.6, subd. (c)(8)). However, the Commission believes that the legislati solar thermal and biomass categories was to consider support for existing power plants technologies, pursuant to the conditions established by the RESIA.

Table 4-1
Allocations to the Existing Renewable Resources Fund By Year

SB 90 ROLLOVER ESTIMATE[26]	2002	2003	2004	2005	2006	Overall[27]
	20.0%	17.5%	15.0%	12.5%	10.0%	15%
$0-$65 Million	$27.00 Million	$23.625 Million	$20.25 Million	$16.875 Million	$13.50 Million	$101.25 Million

Description of Fund

The Existing Renewables Fund will provide existing projects with generation-based production incentives. Although the legislation requires incentives to reduce fuel costs, the Energy Commission believes this can essentially be accomplished by providing a production incentive rather than providing incentives based on fuel purchases. The intent of the legislation is to allow biomass facilities to purchase additional higher cost fuels, which results in additional renewable generation. Providing a generation-based incentive, which then allows biomass facilities to purchase higher cost fuels, obtains the same result as providing an incentive that lowers the cost of the fuel. A production based incentive enables the Energy Commission to guarantee that the funds have contributed to the production of renewable electricity. The process of verifying that payments towards the purchase of eligible fuels have gone toward the production of electricity would be very difficult. How the Energy Commission would verify that fuels receiving the incentive were not resold or used for something other than electrical generation is unclear, and perhaps impossible to do. Therefore, the Energy Commission recommends that biomass facilities receive production-based incentives, in a similar fashion to the incentives paid through SB90.

Before making the findings required by the RESIA, the Committee recommends continuing the tiers structure used successfully in the SB 90 program, which was based on the relative competitiveness and different funding needs of the eligible technologies. Biomass and solar thermal facilities are placed in Tier 1 and will receive an allocation averaging 11 percent of the RESIA funds. Wind facilities fall under Tier 2 and will receive the remaining four percent. The annual distribution, including ramping, is shown in Table 4-2.

Payments are tied to market prices to reward only the most cost-effective generation. Generators will receive payment from the fund only when they generate electricity, with more cost-effective facilities having more incentive to generate. In addition, linking payments to market prices is an important market-based mechanism given recent high

[26] The rollover estimate reflects forecasts of market prices in 2001, and historic generation data from projects participating in the Renewable Energy Program.

[27] The percentages under the years 2002 through 2006 do not include the rollover estimat amounts do not include other contributions or inflation adjustments.

electricity prices. Existing generators are currently receiving high prices for their output at peak periods, and consequently have not needed additional financial incentives. However, it is possible that these high prices will drop sharply in response to events in the market such as increased capacity from natural gas-fired generation or regulatory intervention. In that case, existing renewable generators could have difficulty surviving on market prices alone and would need the incentives to maintain their financial viability.

Table 4-2
Annual Distribution to Existing Renewable Resources

	2002	2003	2004	2005	2006	Overall
Tier 1 (Biomass and Solar Thermal)	15 %	13 %	11 %	9 %	7 %	11 %
Tier 2 (Wind)	5 %	4.5 %	4 %	3.5 %	3 %	4 %
Existing Renewable Resources	20 %	17.5 %	15 %	12.5 %	10 %	15 %

Eligibility for Funding

The Committee believes that the RESIA restricts the eligibility for Existing Renewables Fund support to existing solid-fuel biomass, solar thermal, and wind resources. Existing here has the same meaning as in the SB 90 program — built and generating power for sale before September 26, 1996. Even with these technologies, however, the RESIA requires the Commission to make findings concerning the eligibility of the resources. First, the Energy Commission must determine that existing solar thermal resources enhance the environmental value and reliability of the electricity system and require financial assistance to remain viable. Second, the Energy Commission must determine that existing wind facilities are a cost-effective source of reliability and environmental benefits compared with other eligible sources, and that they need financial assistance to remain economically viable. And, finally, the Energy Commission must determine that solid-fuel biomass facilities provide demonstrable environmental benefits in the form of air quality improvement. While the Committee has recommended an allocation for the Existing Renewables Fund , it has not yet made the required findings. When these findings are made, the allocation for existing technologies may need to be adjusted.

The Committee recommends the following eligibility changes in this Fund from SB 90:

- Allowing generation from projects that are outside California, but are interconnected to the grid within California, and isolated from local interconnection in their areas (i.e., landlocked to California s transmission grid), and

- Disregarding competitive transition charge (CTC) considerations when determining program eligibility

These changes will allow the provision of additional reliability, environmental, and local economic benefits from existing renewable generation. In the case of landlocked facilities just outside of California, these benefits are largely equivalent to those from facilities already eligible, and with independent metering information available, there is no reason to exclude these facilities. In the case of CTC constraints, the Committee believes that these barriers to participation have little justification in the current electricity market.

Recommended Distribution Method

Funds will be distributed through a cents per kilowatt hour (kWh) production incentive for verified eligible renewable generation. The method of fund distribution should be similar to the process used in the SB 90 program. The incentive rate will be based on the difference between a tier-specific target price and the market price (or SRAC, whichever is applicable), subject to a cap. If funds are unavailable to pay facilities at these levels, the incentive will be adjusted to reflect the amount of funds available. A summary of the target prices and the caps for biomass/solar thermal facilities and wind facilities is presented in Table 4-3.

Table 4-3
Proposed Target Prices and Caps
(cents per kWh)

			2002	2003	2004	2005	2006
Tier 1	Biomass and Solar Thermal	Target Price	5.0	5.0	5.0	5.0	5.0
		Cap	1.0	1.0	1.0	1.0	1.0
Tier 2	Wind	Target Price	3.5	3.5	3.5	3.5	3.5
		Cap	1.0	1.0	1.0	1.0	1.0

The proposed target price for biomass and solar thermal technologies is 5.0 cents per kWh. Target priced dropped under SB 90, with the expectation that cost-shifting would occur. when this failed to occur and target prices for Tier 1 technologies dropped under the SB 90 program, biomass facilities were unable to generate as much electricity. Furthermore, the only biomass facility that ceased operations while participating in the program did so after the target price was dropped to 4.0 cents per kWh. In an effort to increase generation from biomass facilities, the Energy Commission raised the target price for Tier 1 technologies back to 5.0 cents per kWh in October 2000. Since the increase, three biomass facilities have indicated plans to reopen by next summer. The target price of 5.0 cents per kWh, therefore, should enable biomass and solar thermal

facilities to operate at levels closer to 100 percent of capacity and encourage other closed facilities to return to operation. The Committee recommends the cap be set at 1.0 cent per kWh. The Committee will also monitor cost-shifting activities, and may reduce the target prices as warranted.

For wind facilities, the Committee recommends that the target price and cap remain at 3.5 cents per kWh hour and 1.0 cent per kWh, respectively. According to the wind industry, the SB 90 payments to existing wind generators helped reverse the trend of declining production from wind facilities. Before 1998, rather than repair broken turbines, some operators of wind facilities removed the working components from broken turbines and used them to keep other wind turbines in operation. In time, this led to fewer operating turbines, reducing the amount of generation from wind facilities. The incentives from the SB 90 program enabled operators to repair turbines with new parts and repower some facilities (removing old turbines and replacing them with newer, more efficient turbines). More than 200 megawatts (MWs) of wind capacity participating in the Existing Renewable Resources Fund has been repowered, which has resulted in an overall increase in generation from these facilities. By maintaining the current target price and cap, existing wind facilities should continue to increase generation, and as the financial situations of these facilities stabilize, they should be able to replace older turbines with newer, more efficient ones.

Potential Changes in Fund over Time

The RESIA requires the Energy Commission to make certain findings regarding the eligibility of existing solid-fuel biomass, solar thermal, and wind technologies. Although the Committee has recommended an allocation for existing technologies, it has not yet made these findings. The allocation for existing technologies may need to be adjusted once these findings are made. This adjustment, should it be made, is likely to be a lowering of the allocation. The Committee believes that it will be easier to start with a higher allocation to existing technologies and adjust downward rather than reducing allocations elsewhere to increase the existing allocation.

Some stakeholders suggested that the target prices, incentive payments, and caps should be adjusted for inflation during the five-year funding period. Given that inflation is likely to lead to higher market prices for energy to the same extent as project costs will increase, and that the incentive provided should be small in proportion to market revenue for a project, the Committee disagrees with this recommendation. In addition, keeping incentive payments and caps constant further encourages existing technologies to become more cost-effective over time, while technology advances can mitigate the impact of inflation on operating costs.

CHAPTER 5

EMERGING RENEWABLE RESOURCES

Recommended Allocation

The Electricity and Natural Gas Committee recommends allocating 10 percent of the Reliable Electric Service Investments Act (RESIA) funding, or $67.5 million, without considering other contributions and inflation adjustments, to buydown incentives and other support mechanisms for emerging in-state electricity generation technologies. The RESIA requires the Energy Commission to identify and support emerging renewable energy technologies that have the greatest near-term commercial promise and that merit targeted assistance. [28] The RESIA also requires the Energy Commission to include specific targets for the increased quantity of California electrical generation produced from emerging technologies. [29] The Committee believes that the emphasis on emerging technologies in the RESIA supports continuing the allocation for the Emerging Renewable Resources Fund at the Senate Bill 90 (SB 90) level, 10 percent, even while a substantial portion of the SB 90 allocation to the Emerging Renewable Resources Account remains unspent at present.

The Committee recommends that any unused funds left in the SB 90 Emerging Renewable Resources Account remain unencumbered. The Committee recommends that these unused funds be rolled over as an initial allocation for the Emerging Renewables Fund. Given this initial allocation and the rate at which Emerging Renewable Resources Account funds have been historically encumbered, the Committee does not believe the Emerging Renewables Fund will need a full 10 percent allocation in the early years of the extended program. The Committee, therefore, recommends an annual allocation of RESIA funds for the Emerging Renewables Fund that begins at five percent and rises by 2.5 percentage points annually, averaging 10 percent over the five years. Table 5-1 shows the annual allocations proposed for the Emerging Renewables Fund , along with expected SB 90 rollover funds.

The Committee notes that the Energy Commission s March 1997 *Policy Report on AB 1890 Renewables Funding*, which was incorporated by reference in SB 90, stated that the first three percent of rollover funds available at the end of the transition period would be used to augment the Emerging Renewable Resources Account. However, given the amount of SB 90 rollover funds expected in that Account, as well as the addition of new RESIA funds, the Committee no longer believes this augmentation is necessary.

[28] /399.6, subd. (a)(2).
[29] /399.6, subd. (a)(3)(A).

Although the SB 90 Emerging Account has had limited participation to date, the Committee believes that high market prices and changes to the market structure will lead to increased activity. The expanded eligibility proposed for the Emerging Renewables Fund should also lead to increased Fund activity. In addition, the Committee proposes altering the division of funds within the Emerging Renewables Fund. SB90 directed the following:

- at least 60 percent of funding go to small systems (10 kilowatts [kW] or less);
- at least 15 percent would go to medium systems (10+ kW-99.9 kW); and
- the remainder, a maximum of 25 percent, could go to large systems (100 kW or larger).

Based on activity over the past two and a half years, the Committee believes that two changes should be made in this allocation structure. First, the Committee recommends that only two categories — small and large — be included in the RESIA buydown program. Second, the Committee recommends that the difference between small and large systems be increased so that systems 50 kW or less are defined as small, while systems greater than 50 kW are defined as large.

Table 5-1
Allocations to the Emerging Renewable Resources Fund By Year

SB 90 ROLLOVER ESTIMATE[30]	2002	2003	2004	2005	2006	Overall[31]
	5.0%	7.5%	10.0%	12.5%	15.0%	10%
$0 — 45 Million	$6.75 Million	$10.125 Million	$13.5 Million	$16.875 Million	$20.25 Million	$67.5 Million

Finally, the Committee recognizes that emerging technologies generally require a long time period to get firmly established in the market and expects that market penetration will exhibit an exponential pattern of growth similar to most successful new consumer products. In addition, flexibility to review and revise the allocation of all funds in the Renewable Resources Trust Fund as deemed needed will ensure that funding could be redirected if market conditions change.

[30] The rollover estimate is based on the total allocation to the Emerging Account from t SB 90 Renewable Energy Program minus disbursements and reservation requests granted (bu paid) as of September 30, 2000.

[31] The percentages under the years 2002 through 2006 do not include the rollover estimat amounts do not include other contributions or inflation adjustments.

Description of Fund

The Emerging Renewables Fund is designed to spur investment in specific renewable technologies which hold promise of providing viable generation alternatives to central station power and which electric customers can invest in for on-site or local distributed generation. The goal is that through financial incentives that encourage both supply-side and demand-side expansion, a healthy, economically sustainable market for these technologies can be developed. The Committee proposes to structure the Emerging Renewables Fund largely as a buydown program similar to the SB 90 Emerging Renewable Resources Account but with expanded eligibility and revised incentive structures.

In addition, the Committee proposes that additional incentives be targeted towards the financing of, manufacturing of, and sale of emerging generation systems in the State. Examples of potential incentives to investigate include:

- Low-cost loans, financing, or underwriting program
- Incentives to develop in-state manufacturing of emerging systems
- Incentives to manufacturers to sell products at the wholesale level in California
- Addressing income tax, property tax, and regulatory/permitting concerns affecting emerging systems
- Alternative incentive programs for qualified non-profit entities

Eligibility for Funding

SB 90 directed that four technologies would be eligible for funding under the Emerging Account: photovoltaics, small wind (10kW or less), fuel cells using renewable fuels and solar thermal electric generation. SB 90 also required projects to be located on the premises of the end-use customer and that projects must be sized to predominately offset the customer s load.

The Committee proposes that, for the Emerging Renewables Fund , eligibility be expanded from the constraints in place in the SB 90 program. These eligibility expansions are supported by the objectives of the RESIA and the experience of implementing the SB 90 program.

First, RESIA requires the Energy Commission to *identify* emerging renewable resource technologies, perhaps implying a directive to go beyond the four technologies established in SB 90. The RESIA also directs the Energy Commission to consider specified fuel cell technologies for eligibility for funding from the program. While the RESIA does not explicitly state that these technologies be considered as emerging (as opposed to being funded elsewhere), the emerging designation seems to be most apt if

these technologies are included in the RESIA program. During workshops held to gather input on the investment plan, stakeholders stated that technologies such as microturbines using a renewable fuel be included in the program.

The Committee, therefore, proposes that, in addition to the four technologies established as emerging by SB 90 — photovoltaics, small wind, solar thermal (electric), and fuel cells that use a renewable fuel, other technologies be considered under the extension program. To identify other prospective emerging technologies, the Committee proposes to borrow from the criteria expressed in the March 1997 *Policy Report*:

1) The technology must be commercially available with at least one vendor available for the sale of the system.

2) Vendors of any generating systems employing the technology must offer at least a five year full warranty on the entire generating system.

3) The technology must show at least one year of demonstrated reliable, predictable, and safe performance by a full-scale facility using this technology under field conditions.

4) The available data must show that generating systems using the technology have a useful design life of at least 20 years.

5) The technology must be designed so that it can produce grid-connected electricity.[32]

6) The technology represents a new electricity generating process not well-represented among existing grid-connected renewable generating facilities, rather than some evolutionary or incremental improvements to renewable technologies used in existing renewable resource technology generating facilities (examples of such evolutionary or incremental improvements will be a) an improved blade design for wind turbines, b) less expensive well drilling techniques for geothermal, or c) a more efficient burner design for a biomass plant).

7) The project must be designed exclusively for the purpose of producing electricity for on-site use or sale (excluding demonstration projects that may sell to one specific customer), in contrast to a research or demonstration facility, which is designed primarily for collecting additional research data.

[32] While technologies must be designed to produce grid-connected electricity, individual
eligible for funding even through they are not physically grid-connected where the docu
establishing a physical connection is less than the unsubsidized cost of the otherwise
Note, this grid-connection criteria varies from the criteria included in the March 199
excluded systems that were not grid-connected because they were deemed to be cost-effec
need financial assistance, and the end users were avoiding CTC payments.

The RESIA implied that another criterion may be reasonable to employ in this identification process. In assessing specified fuel cell technologies, the Energy Commission is required to find, among other things, that financial assistance is required for these technologies to become commercially viable. The Committee proposes that this criterion be applied to all technologies that may be identified as eligible for the Emerging Renewables Fund, and be used to determine whether additional technologies are eligible for assistance and whether technologies that are eligible should continue to receive assistance.

The Committee also proposes that small wind systems up to 50 kW or less be eligible for the program, rather than the present limit of 10 kW or less. Stakeholders testified that the 10 kW limit prevented some applications of systems that should be considered in the same category as the under 10 kW systems. These systems could be installed at commercial business or community sites where 10 kW or less systems may be less appropriate or cost-effective.

A third proposal is to allow utility ownership of emerging systems. The Committee believes that allowing utility ownership of emerging systems could simplify interconnection barriers and would invite programs such as those implemented in the service territories of the Sacramento Municipal Utility District (SMUD) and the Los Angeles Department of Water and Power (LADWP). The Committee proposes that both investor owned utility (IOU) and customer-owned utility ownership of emerging systems be allowed in the extended program. The eligible systems must still be sited within the distribution service areas of the IOUs contributing to the program. However, should a customer-owned utility opt to contribute an amount to the REP proportionate to funds provided by the IOUs, the Committee proposes that emerging systems sited on their customers premises also be eligible.

Finally, the Committee proposes to expand and clarify the definition of grid-connected to include those applications that are not physically connected to the grid, but where the documented cost of establishing a physical connection is less than the unsubsidized cost of the eligible emerging system.

Recommended Distribution Method

The Committee recommends that the primary distribution method for the Emerging Program remain a buydown of system-installed costs as in the SB 90 program. Given the participation of projects in the SB 90 program, however, the Committee believes that the block structure established should be eliminated at this time. Rather than a block structure, the Committee recommends that the buydowns be calculated as a simple 50 percent of system costs, with caps of $3.00 per watt for small systems and 42.50 per watt for large systems. The Committee further proposes that inverter efficiency no longer be included in the calculation of incentive amounts. These caps will be reevaluated on a periodic basis by the Commission to determine their appropriateness, and revised as necessary to provide the correct signals to the market.

Potential Changes in Fund Over Time

The Energy Commission will continue to gather information on costs and market penetration of the emerging technologies. Evaluation of program performance and the need to modify the program will be reviewed on an annual basis.

The Committee recommends that the dollars per watt buydown of system-installed costs not be adjusted for inflation to further encourage these systems to become more cost-effective over time. In addition, the intent of the rebate is to stimulate sales of emerging systems to encourage manufacturers, sellers, and installers to expand their operations and reduce their costs. Increasing the rebate amount is therefore inconsistent with program design, since the level of buydown payment decreases to ensure that the costs of these systems will decrease over time.

CHAPTER 6

CUSTOMER CREDITS

Recommended Allocation

The Electricity and Natural Gas Committee recommends allocating 25 percent of the Reliable Electric Service Investments Act (RESIA) funding, or $168.75 million, without considering other contributions or inflation adjustments, to the Customer Credit Fund.[33] The allocation of 25 percent is based on experience from the Senate Bill 90 (SB 90) program and on public comments received during the investment plan process. Under the SB 90 program, the allocation for customer credits was initially eight percent in 1998, increasing annually such that the allocation was 20 percent by 2001, with an average overall funding level of 14 percent over four years. The ramping up of funding was intended to allow for anticipated market growth; that growth was realized and has actually exceeded expectations.

The proposed allocation of 25 percent is intended to allow the program to continue to provide consistent market signals after year 2001 and to avoid a sudden market disruption. The fixed annual allocation of 25 percent (with no ramping) will allow for some market growth without resulting in a sudden drop in the credit level; however, the market may also expect to see a reduced credit level as the market grows.

Table 6-1 shows the annual allocation proposed for the Customer Credit Fund, along with expected rollover from SB 90 funds.

Table 6-1
Allocations to the Customer Credit Fund By Year

SB 90 ROLLOVER ESTIMATE[34]	2002	2003	2004	2005	2006	Overall[35]
	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
$0	$33.75 Million	$33.75 Million	$33.75 Million	$33.75 Million	$33.75 Million	$168.75 Million

[33] Under the SB 90 legislation, this program was the Customer Credit Subaccount; under the Customer Credit Fund.

[34] The rollover estimate is based on the staff s assumptions of one, three, and five percent growth rates in program participation. All scenarios indicate no rollover in this Account.

[35] The percentages under the years 2002 through 2006 do not include the rollover estimat amounts do not include other contributions or inflation adjustments.

The Customer Credit Subaccount has been an influential factor in the renewable energy market, as shown by the number of direct access customers purchasing renewable energy. Although the number of consumers actually entering the direct access market was a small fraction of those who had the option to enter the market (1.8 percent as of October 2000), the portion of those purchasing renewable energy steadily increased. Effectively, all residential customers who were purchasing energy through the direct access market were purchasing renewable energy by February 2000.[36]

The evidence shows, however, that consumers awareness that they are receiving the customer credit has been low.[37] The increased allocation to the Customer Credit Fund is intended to help develop the renewable market by providing funding to marketers that are capturing consumers interested in purchasing renewable electricity. Electric service providers are uniquely qualified to influence consumer choice, which complements the State s education efforts through the Consumer Education Fund.

The incentive can also help make renewable energy more cost competitive with conventional generation technologies in the near-term, as well as build long-term demand for renewable energy. In the near-term, the customer credit can be used to offset the incremental cost of renewable energy. In the longer term, it can help build demand which can ultimately bring down the cost of renewables. Further, by building demand, the long-term viability of generators is expected to improve even as incentives decline over time. In the end, the market success of renewable energy will depend on demand for the product.

If the customer credit were suddenly cut rather than maintained or gradually lowered, renewable providers would likely find it difficult to recoup their costs and many could be expected to drop out of the market. If the market shrinks to only one or two providers offering renewable energy, then the remaining provider(s) could have unfair market power and those consumers interested in purchasing renewable energy could be asked to pay prices that are unnecessarily higher than the cost of the renewable electricity. Continuing this scenario, if renewable generators have not become cost competitive, especially as advances in conventional technology come on-line, then those generators will have difficulty participating in the market without access to providers promoting their renewable electricity.

Description of Fund

The Customer Credit Fund will provide customers with a cents per kilowatt hour (kWh) rebate for the purchase of qualifying renewable energy. The incentive may vary over time depending upon market demand and the availability of funds. Funds are disbursed

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[36] The data on the number of customers receiving the Customer Credit as collected from M
Performance Reports submitted to the Energy Commission, compared with total direct acce
requests as available from the California Public Utilities Commission.

[37] Renewable Energy Program Preliminary Customer Credit Subaccount Evaluation, Regional
Economic Research, Inc., October 30, 2000.

to electric service providers when they sell in-state renewable energy to consumers. Consumers must be notified that they are purchasing renewable energy that qualifies for the customer credit, and they must be notified about the cents per kWh credit level that they are eligible to receive. Payments are calculated based on the number of eligible kWhs purchased from generators and sold to consumers multiplied by the credit level. Basing the credit payment on energy bought and served to customers means the provider receives more funding from the Fund as the amount of eligible energy sold to consumers increases.

In some cases, electric service providers may find it possible to utilize the customer credit and other incentives of the Renewable Energy Program to market a renewable product at a cost below that of conventional energy. Although there is typically a price premium for renewable energy, available incentives could more than offset that incremental cost and allow for a price discount on renewable energy. Such a pricing scenario is possible in part because the customer credit is not tied to the price of renewable energy, and in part because the market price of renewable energy can be disconnected from fossil fuel prices.

The Committee believes that there are solid market reasons for not tying the customer credit level to energy prices. Market activities such as educating customers about renewables and encouraging them to purchase renewable energy are not related to energy prices but rather are costs incurred by electric service providers seeking to market renewable energy. Also, a stable incentive level that does not fluctuate with energy prices may facilitate long-term power purchase agreements between providers and/or wholesalers and generators. Although renewable energy is typically more expensive than conventional energy, there is no reason why electric service providers should not maximize incentives so as to offer consumers the best possible price for renewable energy.

Some parties have expressed concern that when the customer credit is eventually discontinued, the price for renewable electricity will rise and consumers will switch back to conventional energy. Although this scenario is a possibility, the Committee notes that an introductory low price is not an unusual market strategy and allows consumers to gain experience with a new product at minimum cost. Some customers may continue to purchase renewables if they receive a price discount, but others are likely to develop an interest in continuing to purchase renewable energy. We cannot easily determine which customers have an entirely altruistic interest in renewables, and give the credit only to those customers. Instead, the Committee believes that the customer credit should be used as a tool for facilitating market development, with market forces ultimately determining the success of renewable energy.

Eligibility for Funding

Although the customer credit is a rebate for consumers who purchase renewable energy, payments from the Fund are actually made to electric providers rather than

consumers.[38] To receive funding from the Customer Credit Fund, providers must be registered with the Energy Commission as an eligible renewable provider. Electricity wholesalers (including power pools) that do not sell or broker energy to end-use customers may also register with the Energy Commission if their transactions include eligible renewable energy. Registered wholesalers, however, are not eligible to receive funding from the Fund.

To qualify for the customer credit, electricity must be produced by an eligible renewable generation technology. [39] Energy sold to investor-owned utilities under contracts entered into before 1996, however, is not eligible for customer credits. The attribute of the renewable energy that makes it eligible for the customer credit may be redeemed for customer credits separately from the commodity energy.

The Committee is considering expanding the customer credit program so that energy from facilities located outside of California, but still connected to the WSCC grid, would be eligible for payment. This change would require better verification of out-of-state generation, since such verification is required by the program. Also, if there were significant response to this eligibility expansion, the need for other eligibility changes to reduce demand for the funds would be increased.

Qualifying energy is only eligible for the customer credit if it is then sold to an eligible customer through a direct access transaction. Effective January 1, 2002, the RESIA states that public entities are not eligible to receive the customer credit. However, other consumers in the distribution service territories of utilities that collect the public goods surcharge from rate payers and contribute it to the Renewable Resource Trust Fund are eligible to receive the customer credit.

As in the SB 90 program, funding to non-residential and non-small commercial customers is restricted to $1,000 per customer per year. Collectively, these classes of customers may only receive $33.75 million (20 percent of the funds) over the five-year period covered by this investment plan. This provision is intended to offer an incentive for large customers interested in purchasing renewable energy while avoiding a rapid depletion of the Fund by a relatively small number of customers. The cap is also necessary because although many large customers have expressed a long-term interest in purchasing renewable energy, their electricity purchase decisions appear to be more cost driven than that of residential customers[40] and so care must be taken not to over-subsidize their purchases. Keeping the incentive payment for large customers small relative to their annual costs could help attract customers that are on the margin.

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[38] This feature is intended to reduce state administrative costs, as making payments to consumers would be excessively costly to administer.

[39] As noted in Chapter 3 of this investment plan, the Committee is recommending that new generation facilities located out-of-state but landlocked to the state s transmissior eligible.

[40] Renewable Energy Program Preliminary Evaluation, Regional Economic Research, Inc., Oc

Providers are required to notify customers that they are receiving the customer credit. The notification needs to be standardized such that the information is prominently displayed to consumers on their bills, and through separate mailings if necessary (such may be the case for situations in which customers have electronic billing). This is necessary to increase consumers awareness that they are purchasing renewable energy and receiving the customer credit.

Recommended Distribution Method

Funds will be distributed through a cents per kilowatt hour rebate paid monthly from the Customer Credit Fund to registered renewable providers. Payments will be made from the Fund after the provider reports that it has bought eligible renewable generation and has subsequently sold it to an eligible customer, consistent with the eligibility criteria outlined above. The credit level cannot exceed 1.5 cents per kWh and will be set for a six-month period. At the close of each six-month period the credit level will be re-set by the Energy Commission, as necessary, to reflect changes in market demand for renewable energy.

As in the SB 90 Program, payments will be calculated based on the month that energy was delivered to the eligible customer. The provider will have flexibility such that generation supplies claimed for customer credits do not have to match consumption on an hourly or monthly basis. Supplies generated in one month could be matched with consumer use from a different month, for example, but payments will be based on the credit level that was in place during the month the energy was consumed.

To allow for flexibility and changing market conditions, registered renewable providers will not be required to exactly match load and supplies in any given month. Payments, however, will be based on the minimum value of 1) the eligible renewable supplies purchased by the provider, and 2) the eligible load served to consumers who received the customer credit. Any imbalances between these two figures will be credited to the registered renewable provider and may be drawn upon in calculating payments in a following payment period.

Although the date of generation does not need to match the date of consumption, there needs to be a limit on how much time may elapse between the matching of consumption and generation. This limitation is necessary to stimulate ongoing demand for eligible generation and avoid misleading consumers who may expect that the renewable generation they purchase was recently generated. Consequently, when reporting supplies to the Energy Commission, the energy should be generated in the same calendar year as the load that was served, with some allowance made at the beginning of each calendar year as necessary.

Potential Changes in Fund over Time

Additional eligibility constraints on the Customer Credit Fund may be reasonable so as to provide the most cost-effective near-term benefits, while continuing to pursue the

long-term goal of developing the infrastructure to support a fully competitive renewable industry. The Energy Commission may investigate restricting the credit only to products with a minimum content of new generation, or creating two credit levels — one for new and for existing renewable generation. Eventually, the credit may be limited only to new generation. The Energy Commission may also consider requiring providers dispersing the credit to send educational materials about renewable energy to their customers, or requiring providers to make their customer lists available so that the Energy Commission itself can send materials to these customers.

The Committee recommends that the amount of the customer credit not be adjusted for inflation over the five-year program period. The customer credit is intended to send consistent market signals by providing a fixed credit level over a set period of time. In addition, increasing the credit level is not consistent with program structure, since the credit level is not intended to be adjusted upward, but rather to be adjusted downward in response to increasing demand. Further, the credit is intended as an incentive to customers to purchase renewable energy rather than conventional electricity. Since the costs of both renewables and non-renewables rise and fall equally with inflation, the effect of the incentive remains the same without adjusting it for inflation.

CHAPTER 7

CONSUMER EDUCATION

Recommended Allocation

The Electricity and Natural Gas Committee recommends allocating five percent of the Reliable Electric Service Investments Act (RESIA) funding, or $33.75 million, without considering other contributions or inflation adjustments, to the Consumer Education Program to disseminate information on renewable energy and help develop a consumer market for renewable energy and small-scale emerging renewable energy technologies in California. The allocation of five percent represents a five-fold increase from the level of funding for consumer education activities under the Senate Bill (SB 90) program.

The Committee recommends increasing the allocation to this Fund based on several factors. First, stakeholders have indicated that the SB 90 allocation was insufficient to substantially increase consumer awareness about renewable energy options, especially in a state the size of California. In addition, an independent evaluation of the Renewable Energy Program[41] concluded that the one percent allocation to Consumer Education was not sufficient to get the two messages of renewable energy and emerging renewable technologies out to residential consumers and commercial businesses. The evaluation recommends an allocation of $3 million to $7 million per year at a minimum to successfully implement a multi-faceted approach to developing a consumer market for renewable energy in California. The Committee believes that a five percent allocation to consumer education is appropriate given the size and scope of the job at hand and notes that this amount is significantly less than the funding allotted for other public entity consumer awareness campaigns.

Table 7-1 shows the annual allocations proposed for the Consumer Education Fund, along with expected rollover from SB 90 funds.

Description of Fund

The three primary goals of the Renewable Energy Consumer Education Program are as follows:

- Raise consumer awareness of renewable electricity generation options and their benefits,
- Increase the purchases of both renewable energy from the grid and small-scale emerging renewable technologies, and

[41] Renewable Energy Program Preliminary Evaluation, Regional Economic Research, Inc., Oc

- Leverage strategic alliances and partnerships with organizations connected to renewable energy in California.

Table 7-1
Allocations to the Consumer Education Fund By Year

SB 90 ROLLOVER ESTIMATE[42]	2002	2003	2004	2005	2006	Overall[43]
	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
$0-$3.6 Million	$6.75 Million	$6.75 Million	$6.75 Million	$6.75 Million	$6.75 Million	$33.75 Million

A wide range of consumer education activities have been implemented under the SB 90 program in support of these goals. Under the direction of the Energy Commission, the Renewable Energy Marketing Board (REMB) and their coalition partners conducted grass roots and media activities in targeted communities throughout the State. Market research was conducted to better understand the market for emerging renewable energy technologies. Additionally, grants were awarded to various entities and organizations to support consumer education and outreach activities for the emerging renewable energy market.

In addition to the continued work in these types of consumer education activities, the Committee proposes that education activities include reducing or removing market barriers affecting emerging technologies. These activities could include training/education for permitting and building department personnel to lower the cost and delays associated with permits from local governments and/education on regulatory or utility barriers or hurdles.

The SB 90 program allocated 80 percent of the consumer education funds to support the renewable energy market and 20 percent of the funds to focus on the emerging renewable technologies market with different program administrators for each. This allocation was based on estimations of relative costs of campaign products and activities. A non-profit entity provided program administration for the initial phase of the renewable energy campaign with the Energy Commission staff administering the remaining program activities.

The Committee agrees with the recommendation made by most stakeholders that a single entity should provide program administration for both the renewable energy and emerging renewable technology markets and that, when possible, a single or blended message be developed and disseminated. To maximize flexibility, the staff will

[42] The rollover estimate is based on the total allocation to the Consumer Education Suba beginning of the SB 90 Renewable Energy Program minus disbursements as of September 30,
[43] The percentages under the years 2002 through 2006 do not include the rollover estimat amounts do not include other contributions or inflation adjustments.

administer a single, comprehensive program that integrates a common message with targeted and specific strategies for each market.

Eligibility for Funding

To be eligible for funding from the Consumer Education Program, participants must be one of the following:

1) A nonprofit whose mission or expertise is consistent with the goals and purpose of the Consumer Education Program,

2) An individual or company with marketing, public relations, consumer education or public-interest marketing experience, or

3) A public agency with experience or expertise in the above mentioned topics.

Participants must also comply with the administrative requirements and criteria contained in Energy Commission solicitations through which funding will be distributed.

Projects and programs eligible for funding are required to provide information to consumers about renewable electricity products and emerging renewable generation technologies. Information developed through the program and funded by the Consumer Education Program must be factual and broad-based. Information and messages must be general in nature and not specific to any product, manufacturer or provider.[44] All projects and programs must be inclusive in opportunity. Information on the project or program must be provided in a timely manner so that all interested market participants have an opportunity to coordinate or participate in the project or program.

Recommended Distribution Method

Funds from the Consumer Education Program will be distributed through grants and contracts. Individuals and entities interested in receiving funding must submit an application or proposal in response to a solicitation document issued by the Energy Commission. The solicitation document will specify the amount of funding available, the funding limit on a project or program, the administrative requirements for submitting an application or proposal, the criteria that will be used to evaluate the application or proposal, and the solicitation schedule. The solicitation document will also include a sample funding award agreement identifying the terms and conditions applicable to the award.

Potential Changes in Fund Over Time

Given the distribution mechanism for this Fund, the Committee believes there is no need to adjust expenditures for inflation over time.

[44] Promotions may be technology-specific in the case of activities aimed at emerging technology markets.

CHAPTER 8

FUEL CELLS

The Reliable Electric Service Investments Act (RESIA) directs the Energy Commission to recommend an allocation to specified fuel cell technologies if fuel cells:

1) Have similar or better air pollutant characteristics than renewable technologies in the investment plan.

2) Require financial assistance to become commercially viable in reference to wholesale generation prices.

3) Could contribute significantly to the infrastructure development or other innovation required to meet the long-term objective of a self-sustaining, competitive supply of renewable energy.

Background

Fuel cells combine hydrogen-bearing fuel with air-borne oxygen in an electrochemical reaction to produce electricity, water, and heat. Currently, fuel cells can use natural gas or other fossil fuels. However, the fuels have to be pre-processed into a hydrogen-rich form. Fuel cells can also use hydrogen obtained by electrolysis of water using stand-by electricity from photovoltaics or wind energy.

The areas where there is interest to applying fuel cell technology are for distributed power generation (0.2 to 30 megawatts [MW]), centralized power generation (>100 MW), and in automobiles. For stationary applications such as power generation, natural gas is currently the predominant fuel.

The Emerging Renewable Resources Account of the Senate Bill 90 (SB 90) Renewable Energy Program (REP) provided capital-cost buydowns to purchasers of grid-connected fuel cells that utilize a renewable fuel. Since the beginning of the program in 1998, only one completed fuel system that has received funds from the Emerging Account has been installed.

Air Pollutant Characteristics

The RESIA requires the Energy Commission to make a determination whether or not fuel cells have similar or better air pollutant characteristics than the renewable technologies in the investment plan.

Emissions characteristics are largely determined by whether or not a given technology involves fossil fuels and/or combustion. The combination of these factors results in the emission of various pollutants into the atmosphere. Some renewable technologies, such as biomass and landfill gas, rely on combustion either to either generate electricity or to meet the capacity requirements of contracts with utilities. The renewable technology may also be supplemented with natural gas-powered generation.

The United States Environmental Protection Agency classifies six air pollutants as *Criteria Pollutants*. These pollutants are nitrogen oxides (NOx), sulfur oxides (SOx), carbon monoxide (CO), particulates (PM or PM_{10}), lead, and ozone (VOC/ROG). Based on information from State and federal agencies along with technical papers and literature from manufacturers, emission characteristics for renewable generating technologies and fuel cells were compared to the six criteria pollutants.

There is a spectrum of renewable technologies ranging from those who emit more criteria pollutants to the least. The technologies that rely on combustion have higher criteria pollutant emission rates. The order in the amount of pollutants from higher emissions to lower emissions are as follows: biomass, municipal solid waste, digester gas, landfill gas, solar thermal electric/natural gas, geothermal, and natural gas fuel cells.

Natural gas fuel cells release approximately 1075 lbs of CO_2 per megawatt hour (MWh) while a well-designed fuel cell configuration that recaptures the heat emitted for use can reduce this total to 660 lbs of CO_2 per MWh. While natural gas fuel cells emitted similar criteria pollutants to some renewable technologies, natural gas fuel cells emit higher amounts of Global Warming Potential (GWP) gases than renewable technologies in the investment plan. Geothermal power plants involving steam release CO_2 at a rate of 122 lbs/MWh. Solar thermal electric facilities with supplemental natural gas generation result in carbon dioxide emissions of approximately 490 pounds per MWh. In the area of landfill gas, there is no net increase in carbon dioxide emissions.

Regarding biomass technologies, carbon dioxide emitted by combustion of refuse and biomass may not increase total atmospheric carbon dioxide because regrowing biomass offsets the increase in CO_2 in the atmosphere. However, a detailed analysis is not yet available because a further study of this issue would require the effects of landfilling and decomposition.

The Committee concludes that natural gas fuel cells in cogeneration applications have similar criteria air pollutant characteristics as the renewable technologies in the investment plan, while non-cogeneration applications have higher GWP emissions.

Financial Characteristics

The RESIA required the Energy Commission to determine whether or not fuel cells require financial assistance to become commercially viable in reference to wholesale generation prices.

Wholesale generation prices are determined by a combination of costs to generators, demand, and market forces. For example, in the summer of 2000, wholesale generation prices were affected by the availability of hydroelectric power from the Pacific Northwest. To conduct the analysis, the costs of a new, natural gas-fired combined cycle plant were compared with the cost of a 200 kW phosphoric acid fuel cell (PAFC). The PAFC was used in this analysis because this technology has a performance track record.

The cost of a 200 kW PAFC is approximately $4,000 per kilowatt (kW), while the current cost of a natural gas-fired combined cycle power plant is $500 per kW. While the cost of energy generated at these new natural gas plants is estimated at 2.8 cents per kWh (using natural gas fuel prices of $3.50 per MMBtu), the cost of generating electricity using fuel cells is 8.7 cents per kWh, roughly three times the cost of natural gas plants. With higher natural gas costs, both conventional power and fuel cell costs would change. If a natural gas fuel cell system is configured for combined heat and power, the value of recovered heat is approximately 1.4 cents per kWh. This benefit offsets one quarter of the difference between wholesale generation prices and the cost of electricity from the PAFC.

Additionally, the rate of sales of these systems indicates that fuel cells are not commercially viable. While the total number of fuel cells installed is approximately 200 systems, annual production is less than 100 units, which has not been sufficient to yield price reductions necessary to create greater demand.

Because of these factors, we could conclude that non-cogeneration natural gas fuel cells are not currently viable in reference to wholesale generation prices, while cogeneration fuel cells may be viable. If commercial viability is to be achieved, it is likely that financial assistance will be required to help create a market for fuel cells.

Fuel Cells and the Development of Renewable Resources

The RESIA required the Energy Commission to determine if fuel cells could contribute significantly to the infrastructure development or other innovation required to meet the long-term objective of a self-sustaining, competitive supply of renewable energy.

There are a variety of ways in which natural gas fuel cells might contribute to development of fuel cell technology and markets that will be involved with long-term, self sustaining, competitive renewable energy supply. Increased production volumes for either or both natural gas and renewable fuel applications could benefit renewable

energy markets in the long-term. Production increases due to opportunities in this market for fuel cells would contribute to the infrastructure development of renewable energy and might result in cost reductions per unit. These opportunities, which come from the air pollutant characteristics and high efficiency of the technology, will contribute to the long-term prospects of fuel cells.

Experience gained with fuel cells can be expected to contribute to the resolution of issues that hinder larger scale use of distributed generation technologies. These issues include interconnection standards, safety, transmission and distribution system stability and dispatch, and requirements and prices for backup or standby power. The resolution of these issues may speed the adoption of currently available renewable technologies, including solar and wind.

Currently, the market for natural gas fuel cells is much larger than the market for fuel cells utilizing renewable fuel. Because current production volumes are small relative to those required to see volume-related price decreases, and because the size of even just the niche natural gas markets could yield significant cost reductions, natural gas fuel cells are capable, at the present time, of contributing to the infrastructure development and innovation required to meet the long-term objective of a self-sustaining competitive supply of renewable energy. The Committee believes that this is a snort-term condition that will decrease in relevance as interconnection issues are resolved and economies of scale are realized.

Funding Allocation

The Committee believes that cogeneration fuel cells meet the standards for air pollution, financial needs, and the support for a long-term, viable infrastructure of renewable energy in California.

DEFINITIONS

Aggregator any marketer, broker, public agency, city, county, or special district, who combines the loads of multiple end-use customers in facilitating the sale and purchase of electric energy, transmission, and other services on behalf of these customers (Public Resources Code section 331(a)).

Biomass any organic material not derived from fossil fuels.

Broker an entity arranging the sale and purchase of electric energy, transmission, and other services between buyers and sellers, but does not take title to any of the power sold (Public Resources Code section 331(b)).

California in-state electrical corporations Pacific Gas and Electric Company, San Diego Gas and Electric Company, Southern California Edison, and any other electrical corporations contributing funds to the Emerging Renewable Resources Account of the Renewable Resources Trust Fund.

Capacity the maximum amount of electricity that a generating unit, power facility, or utility can produce under specified conditions. Capacity is measured in megawatts.

Capacity payments payments to electricity generators for their electric generating capacity, currently based on the costs of installing a low-cost generation type (i.e. combustion turbine) that a utility would add strictly for reliability.

Commercially available complete generating systems based on a designated emerging technology are available for immediate purchase under typical business terms and deliverable within a reasonable period of time.

Competitive transition charge (CTC) a charge authorized by the California Public Utilities Commission that is imposed on investor-owned utility (IOU) ratepayers (i.e. customers that receive electricity distribution services from the IOU) to recover the costs of utility investments made on behalf of their former customers. The CTC is to be collected in a competitively-neutral manner that does not increase rates for any customer class solely due to the existence of transition costs. [Public Utilities Code Section 367 (added by AB 1890)]

Contract for differences contracts between buyers and generators for electricity that rebate the difference between the contract price and the price of purchasing electricity from the Power Exchange. These contracts provide a form of virtual direct access whereby each party receives the benefit of a stable price but neither needs to actually generate or take power.

Conventional power source Public Utilities Code Section 2805 defines a conventional power source as power derived from nuclear energy, or the operation of a hydropower facility greater than 30 megawatts, or the combustion of fossil fuels with the exception of cogeneration.

Customer credit the credit a provider shows on customer bills and seeks reimbursement for from the Customer Credit Account.

Digester gas gas from the anaerobic digestion of biological wastes.

Direct-access market the portion of the electricity industry in California involving acquiring and selling electricity to customers via a Direct Access Service Request, or by contracting directly with a nonresidential, non small-commercial customer, as defined in AB 1890.

Electric service provider an entity such as a marketer or aggregator who provides electricity directly to an end-use customer.

Electrical corporation see Section 218 of the Public Utilities Code

Emerging renewable generation technologies those renewable generation technologies specifically covered under *Guidebook Volume 3: Emerging Renewable Resources Account*, publication number P500-97-0011V3, and any other emerging technologies specifically identified by the Energy Commission as meeting the criteria necessary to be considered emerging.

End-use customer a residential, commercial, agricultural, or industrial customer in the electric industry who buys electric power to be consumed as a final product (not for resale).

Facility see ***project.***

Fixed energy payments payments to a generator for energy delivered under a power purchase contract, which are based on a price per unit measure of electricity that was known or ascertainable at the time the contract was entered into. (Fixed energy payments cannot be based on market conditions, such as short-run avoided costs, since these conditions were not known or ascertainable at the time the power purchase contract was entered into).

Fossil fuel hydrocarbons, including coal, petroleum, or natural gas, occurring in and extracted from underground deposits, and mixtures or byproducts of these hydrocarbons.

Full-scale - of a scale or size equal or comparable to the scale at which commercially available generating systems are being sold or are expected to be sold.

Geothermal natural heat from within the earth, captured for production of electric power, space heating, or industrial steam.

Gigawatt-hour (GWh) — one million kilowatt-hours

Grid — the transmission and distribution system linking power plants to customers through high power transmission line service.

Grid connected — The condition whereby a generating system serves and is electrically connected to electrical load(s) that are also connected to and served by the local utility electrical grid.

Hydroelectric a technology that produces electricity from falling water that turns a turbine generator, referred to as hydro. See also small hydro.

Installed capacity — as opposed to nameplate capacity,

In-state renewable generation biomass, solar thermal, photovoltaic, wind, geothermal, small hydropower of 30 megawatts or less, waste tire, digester gas, landfill gas, and municipal solid waste generation technologies, as described in the Policy Report on AB 1890 Renewables Funding, including any additions or enhancements thereto, that are produced in facilities located in this State and placed in operation after September 26, 1996, or that were operational before that date, and that are also certified under Section 292.207 of Title 18 of the Code of Federal Regulations as a qualifying small power production facility either located in California, or that began selling electricity to a California electrical corporation before September 26, 1996, under a Standard Offer Power Purchase Agreement authorized by the California Public Utilities Commission.

In-state renewable supplier a supplier of in-state renewable generation.

Investor-owned utility (IOU) a utility that is organized as a tax-paying business, whose properties are managed by representatives elected by shareholders.

Kilowatt (kW) one thousand watts. A unit of measure for the amount of electricity needed to operate given equipment. A typical home using central air conditioning and other equipment might have a demand of 4-6 kW on a hot summer afternoon.

Kilowatt hour (kWh) the most commonly-used unit of measure telling the amount of electricity consumed over time. It means one kilowatt of electricity supplied for one hour. A typical California household consumes about 500 kWh in an average month.

Landfill gas (LFG) gas produced by the breakdown of organic matter in a landfill (composed primarily of methane and carbon dioxide) or the technology that uses this gas to produce power.

Load — the amount of electric power supplied to meet one or more end user s needs.

Local publicly owned electric utility as defined in Public Utilities Code section 9604, subdivision (d), and which includes a municipal utility district, a public utility district, an irrigation district, or a joint powers authority made up of one or more of these entities.

Market price — price paid for energy in California s electricity market.

Marketer an entity who takes title to electric power and then resells the power to end-use customers.

Megawatt (MW) one thousand kilowatts. One megawatt is about the amount of power to meet the peak demand of a large hotel.

Metered —The independent measurement with a standard meter of the electricity generated by a project or facility.

Municipal solid waste (MSW) garbage which can be processed and burned to produce energy.

Municipal utility a local publicly owned (customer-owned) electric utility that owns or operates electric facilities subject to the jurisdiction of a municipality, as opposed to the California Public Utilities Commission.

Nameplate capacity — the maximum amount of electricity that a generating unit, power plant or utility can produce under specified conditions, measured in kilowatts or megawatts.

On-site generation — any electricity that is generated and used to serve load on that same site.

PG&E Pacific Gas & Electric Company

Photovoltaic (PV) a technology using a semiconductor that converts light directly into electricity.

Power Exchange (PX) an independent, nonprofit entity created pursuant to AB 1890 that is responsible for conducting an auction for the generators seeking to sell energy and for loads which are not otherwise being served by bilateral contracts. The Power Exchange will be responsible for scheduling generation, determining hourly market clearing prices for its market, and settling and billing for suppliers and retailers using its market.

Power pool — an entity into which many generators may offer to sell their power and out of which many electric service providers or wholesalers may offer to purchase power,

such that the buyer and seller need have no knowledge of each others identity (because the buyer is buying pooled power and not power from a specific generator), such that at least some portion of the power sold into the pool is eligible renewable as defined in P.U.C. section 398.4(h)(1)(F) and also such that the amount of power sold into the pool equals the amount of power purchased from the pool over the calendar year.

Price cliff — the end of the fixed energy price portion of a Standard Offer 4 contract between an electricity generator and an investor-owned utility, after which the generator receives energy payments based on the short-run avoided cost, which is typically much lower than the contract price (usually occurs in year 11 of the contract).

Project **—** For the purposes of the New Renewable Resources Account, a group of one or more pieces of generating equipment, and ancillary equipment necessary to attach to the transmission grid, that is unequivocally separable from any other generating equipment or components. Two or more sets of generating equipment that are contiguous, or that share common control or maintenance facilities and schedules and are located within a one mile radius shall constitute a single project.

Project — For the purposes of the Emerging Renewable Resources Account, all otherwise eligible generating systems installed during the term of this program at one physical site and serving the electrical needs of all real and personal property located at this site, where a site is a single parcel of real property plus any improvements.

Provider an entity that is either a supplier, marketer, or aggregator, or some combination, that provides electricity to end-use customers.

Public benefits charge a surcharge applied to the electric bills of IOU ratepayers used to support energy efficiency, research, development an demonstration (RD&D), low income, and renewables programs.

Public Utility Regulatory Policies Act (PURPA) — Federal legislation passed in 1978 implemented by the Federal Energy Regulatory Commission and the California Public Utilities Commission (CPUC). Under PURPA each electric utility is required to offer to purchase available electric energy from cogeneration and small power production facilities at the utilities avoided cost.

Qualifying facility a qualifying small power production facility eligible for certification pursuant to Section 292.207 of Title 18 of the Code of Federal Regulations.

Repower(ed) generically refers to replacing a significant portion of the generating equipment at an existing facility.

SCE Southern California Edison Company

SDG&E San Diego Gas & Electric Company

Self-generation generation of electricity used on-site and not sold into the main power grid.

Small hydro a facility employing one or more hydroelectric turbine generators, the sum capacity of which does not exceed 30 megawatts. For purposes of this definition, facility shall be defined in a manner consistent with Title 18 of the Code of Federal Regulations, sections 292.201 et seq., provided however that the size of the facility is limited to 30 megawatts, rather than 80 megawatts.

Solar thermal electric the conversion of sunlight to heat and its concentration and use to power a generator to produce electricity.

Solid-fuel biomass a biomass technology that utilizes solid fuel, such wood, agricultural waste, and other organic material that may be burned to produce electricity.

Supplier a facility that generates electricity.

Tier — technology-specific division within the Existing Renewable Resources Account

Wholesaler an entity which buys and sells electricity to providers, or one who acts as a broker in negotiating sales of power to providers.